



SEQUENCE LISTING

<110> WILDT, Stefan
MIELE, Robert G.
NETT, Juergen H.
DAVIDSON, Robert C.

<120> METHODS TO ENGINEER MAMMALIAN-TYPE
CARBOHYDRATE STRUCTURES

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<140> 10/500,240

<141> 2005-03-23

<150> PCT/US02/41510

<151> 2002-12-24

<150> 60/344,169

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<221> MOD_RES

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<400> 24

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| Met | Glu | Gly | Glu | Gln | Ser | Pro | Gln | Gly | Glu | Lys | Ser | Leu | Gln | Arg | Lys |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Gln | Phe | Val | Arg | Pro | Pro | Leu | Asp | Leu | Trp | Gln | Asp | Leu | Lys | Asp | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Val | Arg | Tyr | Val | Ile | Phe | Asp | Cys | Arg | Ala | Asn | Leu | Ile | Val | Met | Pro |
| | | 35 | | | | 40 | | | | | | 45 | | | |
| Leu | Leu | Ile | Leu | Phe | Glu | Ser | Met | Leu | Cys | Lys | Ile | Ile | Ile | Lys | Lys |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Val | Ala | Tyr | Thr | Glu | Ile | Asp | Tyr | Lys | Ala | Tyr | Met | Glu | Gln | Ile | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Met | Ile | Gln | Leu | Asp | Gly | Met | Leu | Asp | Tyr | Ser | Gln | Val | Ser | Gly | Gly |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Thr | Gly | Pro | Leu | Val | Tyr | Pro | Ala | Gly | His | Val | Leu | Ile | Tyr | Lys | Met |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Met | Tyr | Trp | Leu | Thr | Glu | Gly | Met | Asp | His | Val | Glu | Arg | Gly | Gln | Val |
| | | 115 | | | | 120 | | | | | | 125 | | | |
| Phe | Phe | Arg | Tyr | Leu | Tyr | Leu | Leu | Thr | Leu | Ala | Leu | Gln | Met | Ala | Cys |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Tyr | Tyr | Leu | Leu | His | Leu | Pro | Pro | Trp | Cys | Val | Val | Leu | Ala | Cys | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ser | Lys | Arg | Leu | His | Ser | Ile | Tyr | Val | Leu | Arg | Leu | Phe | Asn | Asp | Cys |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Phe | Thr | Thr | Leu | Phe | Met | Val | Val | Thr | Val | Leu | Gly | Ala | Ile | Val | Ala |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ser | Arg | Cys | His | Gln | Arg | Pro | Lys | Leu | Lys | Lys | Ser | Leu | Ala | Leu | Val |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ile | Ser | Ala | Thr | Tyr | Ser | Met | Ala | Val | Ser | Ile | Lys | Met | Asn | Ala | Leu |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Leu | Tyr | Phe | Pro | Ala | Met | Met | Ile | Ser | Leu | Phe | Ile | Leu | Asn | Asp | Ala |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Asn | Val | Ile | Leu | Thr | Leu | Leu | Asp | Leu | Val | Ala | Met | Ile | Ala | Trp | Gln |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Val | Ala | Val | Ala | Val | Pro | Phe | Leu | Arg | Ser | Phe | Pro | Gln | Gln | Tyr | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| His | Cys | Ala | Phe | Asn | Phe | Gly | Arg | Lys | Phe | Met | Tyr | Gln | Trp | Ser | Ile |
| | | 275 | | | | 280 | | | | | | 285 | | | |
| Asn | Trp | Gln | Met | Met | Asp | Glu | Glu | Ala | Phe | Asn | Asp | Lys | Arg | Phe | Xaa |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Phe | Val |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Thr | Arg | Tyr | Pro | Arg | Ile | Leu | Pro | Asp | Leu | Trp | Ser | Ser | Leu | Cys | His |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Pro | Leu | Arg | Lys | Asn | Ala | Val | Leu | Asn | Ala | Asn | Pro | Ala | Lys | Thr | Ile |
| | | 340 | | | | | | 345 | | | | | 350 | | |
| Pro | Phe | Val | Leu | Ile | Ala | Ser | Asn | Phe | Ile | Gly | Val | Leu | Phe | Ser | Arg |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Ser | Leu | His | Tyr | Gln | Phe | Leu | Ser | Trp | Tyr | His | Trp | Thr | Leu | Pro | Ile |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Leu | Ile | Phe | Trp | Ser | Gly | Met | Pro | Phe | Phe | Val | Gly | Pro | Ile | Trp | Tyr |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Val | Leu | His | Glu | Trp | Cys | Trp | Asn | Ser | Tyr | Pro | Pro | Asn | Ser | Gln | Xaa |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | | | 420 | | | | | 425 | | | | | 430 | | | | |
| Xaa | Xaa | Xaa | Xaa | Ser | Gly | Ser | Val | Ala | Leu | Ala | Lys | Ser | His | Leu | Arg | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | |
| Thr | Thr | Ser | Ser | Met | Glu | Lys | Lys | Leu | Asn | | | | | | | | |
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<210> 25

<211> 458

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 25

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| Met | Glu | Gly | Glu | Gln | Ser | Pro | Gln | Gly | Glu | Lys | Ser | Leu | Gln | Arg | Lys | | |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | | | |
| Gln | Phe | Val | Arg | Pro | Pro | Leu | Asp | Leu | Trp | Gln | Asp | Leu | Lys | Asp | Gly | | |
| | | 20 | | | | | | 25 | | | | | 30 | | | | |
| Val | Arg | Tyr | Val | Ile | Phe | Asp | Cys | Arg | Ala | Asn | Leu | Ile | Val | Met | Pro | | |
| | 35 | | | | | 40 | | | | | | 45 | | | | | |
| Leu | Leu | Ile | Leu | Phe | Glu | Ser | Met | Leu | Cys | Lys | Ile | Ile | Ile | Lys | Lys | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Val | Ala | Tyr | Thr | Glu | Ile | Asp | Tyr | Lys | Ala | Tyr | Met | Glu | Gln | Ile | Glu | | |
| 65 | | | | 70 | | | | | | 75 | | | | | 80 | | |
| Met | Ile | Gln | Leu | Asp | Gly | Met | Leu | Asp | Tyr | Ser | Gln | Val | Ser | Gly | Gly | | |
| | | | 85 | | | | | 90 | | | | | | 95 | | | |
| Thr | Gly | Pro | Leu | Val | Tyr | Pro | Ala | Gly | His | Val | Leu | Ile | Tyr | Lys | Met | | |
| | | 100 | | | | | | 105 | | | | | 110 | | | | |
| Met | Tyr | Trp | Leu | Thr | Glu | Gly | Met | Asp | His | Val | Glu | Arg | Gly | Gln | Val | | |
| | 115 | | | | | 120 | | | | | | 125 | | | | | |
| Phe | Phe | Arg | Tyr | Leu | Tyr | Leu | Leu | Thr | Leu | Ala | Leu | Gln | Met | Ala | Cys | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| Tyr | Tyr | Leu | Leu | His | Leu | Pro | Pro | Trp | Cys | Val | Val | Leu | Ala | Cys | Leu | | |
| 145 | | | | 150 | | | | | | 155 | | | | | 160 | | |
| Ser | Lys | Arg | Leu | His | Ser | Ile | Tyr | Val | Leu | Arg | Leu | Phe | Asn | Asp | Cys | | |
| | | | 165 | | | | | 170 | | | | | | 175 | | | |
| Phe | Thr | Thr | Leu | Phe | Met | Val | Val | Thr | Val | Leu | Gly | Ala | Ile | Val | Ala | | |
| | 180 | | | | | | | 185 | | | | | 190 | | | | |
| Ser | Arg | Cys | His | Gln | Arg | Pro | Lys | Leu | Lys | Lys | Ser | Leu | Ala | Leu | Val | | |
| | 195 | | | | | 200 | | | | | | 205 | | | | | |
| Ile | Ser | Ala | Thr | Tyr | Ser | Met | Ala | Val | Ser | Ile | Lys | Met | Asn | Ala | Leu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Leu | Tyr | Phe | Pro | Ala | Met | Met | Ile | Ser | Leu | Phe | Ile | Leu | Asn | Asp | Ala | | |
| 225 | | | | 230 | | | | | | 235 | | | | | 240 | | |
| Asn | Val | Ile | Leu | Thr | Leu | Leu | Asp | Leu | Val | Ala | Met | Ile | Ala | Trp | Gln | | |
| | | | 245 | | | | | 250 | | | | | | 255 | | | |
| Val | Ala | Val | Ala | Val | Pro | Phe | Leu | Arg | Ser | Phe | Pro | Gln | Gln | Tyr | Leu | | |
| | 260 | | | | | | | 265 | | | | | 270 | | | | |
| His | Cys | Ala | Phe | Asn | Phe | Gly | Arg | Lys | Phe | Met | Tyr | Gln | Trp | Ser | Ile | | |
| | 275 | | | | | 280 | | | | | | 285 | | | | | |
| Asn | Trp | Gln | Met | Met | Asp | Glu | Glu | Ala | Phe | Asn | Asp | Lys | Arg | Phe | His | | |
| | 290 | | | | 295 | | | | | | 300 | | | | | | |
| Leu | Ala | Leu | Leu | Ile | Ser | His | Leu | Ile | Ala | Leu | Thr | Thr | Leu | Phe | Val | | |
| 305 | | | | 310 | | | | | | 315 | | | | | 320 | | |
| Thr | Arg | Tyr | Pro | Arg | Ile | Leu | Pro | Asp | Leu | Trp | Ser | Ser | Leu | Cys | His | | |
| | | | 325 | | | | | 330 | | | | | | 335 | | | |
| Pro | Leu | Arg | Lys | Asn | Ala | Val | Leu | Asn | Ala | Asn | Pro | Ala | Lys | Thr | Ile | | |
| | | 340 | | | | | 345 | | | | | 350 | | | | | |
| Pro | Phe | Val | Leu | Ile | Ala | Ser | Asn | Phe | Ile | Gly | Val | Leu | Phe | Ser | Arg | | |

```

          355                      360                      365
Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile
  370                      375                      380
Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr
  385                      390                      395                      400
Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser Gln Ala
          405                      410                      415
Ser Thr Leu Leu Leu Ala Leu Asn Thr Val Leu Leu Leu Leu Leu Ala
          420                      425                      430
Leu Thr Gln Leu Ser Gly Ser Val Ala Leu Ala Lys Ser His Leu Arg
          435                      440                      445
Thr Thr Ser Ser Met Glu Lys Lys Leu Asn
  450                      455

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<210> 26

<211> 443

<212> PRT

<213> *Saccharomyces cerevisiae*

<220>

<221> MOD_RES

<222> (333)...(347)

<223> Xaa is a variable amino acid

<400> 26

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Trp Gln Asp Leu Lys Asp Gly Val Arg Tyr Val Ile Phe Asp Cys Arg
  1          5          10          15
Ala Asn Leu Ile Val Met Pro Leu Leu Ile Leu Phe Glu Ser Met Leu
  20          25          30
Cys Lys Ile Ile Ile Lys Lys Val Ala Tyr Thr Glu Ile Asp Tyr Lys
  35          40          45
Ala Tyr Met Glu Gln Ile Glu Met Ile Gln Leu Asp Gly Met Leu Asp
  50          55          60
Tyr Ser Gln Val Ser Gly Gly Thr Gly Pro Leu Val Tyr Pro Ala Gly
  65          70          75          80
His Val Leu Ile Tyr Lys Met Met Tyr Trp Leu Thr Glu Gly Met Asp
          85          90          95
His Val Glu Arg Gly Gln Val Phe Phe Arg Tyr Leu Tyr Leu Leu Thr
          100          105          110
Leu Ala Leu Gln Met Ala Cys Tyr Tyr Leu Leu His Leu Pro Pro Trp
          115          120          125
Cys Val Val Leu Ala Cys Leu Ser Lys Arg Leu His Ser Ile Tyr Val
          130          135          140
Leu Arg Leu Phe Asn Asp Cys Phe Thr Thr Leu Phe Met Val Val Thr
          145          150          155          160
Val Leu Gly Ala Ile Val Ala Ser Arg Cys His Gln Arg Pro Lys Leu
          165          170          175
Lys Lys His Gln Thr Cys Lys Val Pro Phe Val Phe Phe Phe Met
          180          185          190
Cys Cys Ala Ser Tyr Arg Val His Ser Ile Phe Val Leu Arg Leu Phe
          195          200          205
Asn Asp Pro Val Ala Met Val Leu Leu Phe Leu Ser Ile Asn Leu Leu
          210          215          220
Leu Ala Gln Arg Trp Gly Trp Gly Ser Leu Ala Leu Val Ile Ser Ala
          225          230          235          240
Thr Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr Phe
          245          250          255

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```

Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val Ile
      260                      265                      270
Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala Val
      275                      280                      285
Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys Ala
      290                      295                      300
Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp Gln
305                      310                      315                      320
Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe Xaa Xaa Xaa Xaa
      325                      330                      335
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Val Thr Arg Tyr
      340                      345                      350
Pro Arg Ile Leu Pro Asp Leu Trp Ser Ser Leu Cys His Pro Leu Arg
      355                      360                      365
Lys Asn Ala Val Leu Asn Ala Asn Pro Ala Lys Thr Ile Pro Phe Val
      370                      375                      380
Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser Arg Ser Leu His
385                      390                      395                      400
Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile Leu Ile Phe
      405                      410                      415
Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr Val Leu His
      420                      425                      430
Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser
      435                      440

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<210> 27
<211> 373
<212> PRT
<213> Homo sapiens

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Trp Gln Glu Arg Arg Leu Leu Leu Arg Glu Pro Arg Tyr Thr Leu Leu
 1                      5                      10                      15
Val Ala Ala Cys Leu Cys Leu Ala Glu Val Gly Ile Thr Phe Trp Val
      20                      25                      30
Ile His Arg Val Ala Tyr Thr Glu Ile Asp Trp Lys Ala Tyr Met Ala
      35                      40                      45
Glu Val Glu Gly Val Gly Thr Tyr Asp Tyr Thr Gln Leu Gln Gly Asp
      50                      55                      60
Thr Gly Pro Leu Val Tyr Pro Ala Gly Phe Val Tyr Ile Phe Met Gly
65                      70                      75                      80
Leu Tyr Tyr Ala Thr Ser Arg Gly Thr Asp Ile Arg Met Ala Gln Asn
      85                      90                      95
Ile Phe Ala Val Leu Tyr Leu Ala Thr Leu Leu Leu Val Phe Leu Ile
      100                     105                     110
Tyr His Gln Thr Cys Lys Val Pro Pro Phe Val Phe Phe Phe Met Cys
      115                     120                     125
Cys Ala Ser Tyr Arg Val His Ser Ile Phe Val Leu Arg Leu Phe Asn
      130                     135                     140
Asp Pro Val Ala Met Val Leu Leu Phe Leu Ser Ile Asn Leu Leu Leu
145                     150                     155                     160
Ala Gln Arg Trp Gly Trp Gly Cys Cys Phe Phe Ser Leu Ala Val Ser
      165                     170                     175
Val Lys Met Asn Val Leu Leu Phe Ala Pro Gly Leu Leu Phe Leu Leu
      180                     185                     190
Leu Thr Gln Phe Gly Phe Arg Gly Ala Leu Pro Lys Leu Gly Ile Cys
      195                     200                     205

```

```

Ala Gly Leu Gln Val Val Leu Gly Leu Pro Phe Leu Leu Glu Asn Pro
 210          215          220
Ser Gly Tyr Leu Ser Arg Ser Phe Asp Leu Gly Arg Gln Phe Leu Phe
225          230          235          240
His Trp Thr Val Asn Trp Arg Phe Leu Pro Glu Ala Leu Phe Leu His
          245          250          255
Arg Ala Phe His Leu Ala Leu Leu Thr Ala His Leu Thr Leu Leu Leu
          260          265          270
Leu Phe Ala Leu Cys Arg Trp His Arg Thr Gly Glu Ser Ile Leu Ser
          275          280          285
Leu Leu Arg Asp Pro Ser Lys Arg Lys Val Pro Pro Gln Pro Leu Thr
290          295          300
Pro Asn Gln Ile Val Ser Thr Leu Phe Thr Ser Asn Phe Ile Gly Ile
305          310          315          320
Cys Phe Ser Arg Ser Leu His Tyr Gln Phe Tyr Val Trp Tyr Phe His
          325          330          335
Thr Leu Pro Tyr Leu Leu Trp Ala Met Pro Ala Arg Trp Leu Thr His
          340          345          350
Leu Leu Arg Leu Leu Val Leu Gly Leu Ile Glu Leu Ser Trp Asn Thr
          355          360          365
Tyr Pro Ser Thr Ser
370

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<210> 28
<211> 269
<212> PRT
<213> Saccharomyces cerevisiae

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Val Arg Tyr Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro
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Leu Leu Ile Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys
          20          25          30
Val Ala Tyr Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu
          35          40          45
Met Ile Gln Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly
          50          55          60
Thr Gly Pro Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met
65          70          75          80
Met Tyr Trp Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val
          85          90          95
Phe Phe Arg Tyr Leu Tyr Leu Leu Thr Leu Ala Leu Gln Met Ala Cys
          100          105          110
Tyr Tyr Leu Leu His Pro Trp Cys Val Val Leu Ala Cys Leu Ser Lys
          115          120          125
Arg Leu His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Cys Phe Thr
130          135          140
Thr Leu Phe Met Val Val Thr Val Leu Gly Ala Ile Val Ala Ser Arg
145          150          155          160
Cys His Gln Arg Pro Lys Leu Lys Lys Ser Leu Ala Leu Val Ile Ser
          165          170          175
Ala Thr Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr
          180          185          190
Phe Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val
          195          200          205
Ile Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala
210          215          220

```

Val Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys
 225 230 235 240
 Ala Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp
 245 250 255
 Gln Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe
 260 265

<210> 29
 <211> 258
 <212> PRT
 <213> *Drosophila virilis*

<400> 29
 Ile Lys Tyr Leu Ala Phe Glu Pro Ala Ala Leu Pro Ile Val Ser Val
 1 5 10 15
 Leu Ile Val Leu Ala Glu Ala Val Ile Asn Val Leu Val Ile Gln Arg
 20 25 30
 Val Pro Tyr Thr Glu Ile Asp Trp Lys Ala Tyr Met Gln Glu Cys Glu
 35 40 45
 Gly Phe Leu Asn Gly Thr Thr Asn Tyr Ser Leu Leu Arg Gly Asp Thr
 50 55 60
 Gly Pro Leu Val Tyr Pro Ala Ala Phe Val Tyr Ile Tyr Ser Gly Leu
 65 70 75 80
 Tyr Tyr Leu Thr Gly Gln Gly Thr Asn Val Arg Leu Ala Gln Tyr Ile
 85 90 95
 Phe Ala Cys Ile Tyr Leu Leu Gln Met Cys Leu Val Leu Arg Leu Tyr
 100 105 110
 Thr Lys Ser Arg Lys Val Pro Pro Tyr Val Leu Val Leu Ser Ala Phe
 115 120 125
 Thr Ser Tyr Arg Ile His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp
 130 135 140
 Pro Val Ala Ile Leu Leu Leu Tyr Ala Ala Leu Asn Leu Phe Leu Asp
 145 150 155 160
 Gln Arg Trp Thr Leu Gly Ser Ile Cys Tyr Ser Leu Ala Val Gly Val
 165 170 175
 Lys Met Asn Ile Leu Leu Phe Ala Pro Ala Leu Leu Leu Phe Tyr Leu
 180 185 190
 Ala Asn Leu Gly Val Leu Arg Thr Leu Val Gln Leu Thr Ile Cys Ala
 195 200 205
 Val Leu Gln Leu Phe Ile Gly Ala Pro Phe Leu Arg Thr His Pro Met
 210 215 220
 Glu Tyr Leu Arg Gly Ser Phe Asp Leu Gly Arg Ile Phe Glu His Lys
 225 230 235 240
 Trp Thr Val Asn Tyr Arg Phe Leu Ser Lys Glu Leu Phe Glu Gln Arg
 245 250 255
 Glu Phe

<210> 30
 <211> 267
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 30
 Arg Tyr Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro Leu
 1 5 10 15

```

Leu Ile Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys Val
      20      25      30
Ala Tyr Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu Met
      35      40      45
Ile Gln Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly Thr
      50      55      60
Gly Pro Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met Met
      65      70      75      80
Tyr Trp Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val Phe
      85      90      95
Phe Arg Tyr Leu Tyr Leu Leu Thr Leu Ala Leu Gln Met Ala Cys Tyr
      100      105      110
Tyr Leu Leu His Trp Cys Val Val Leu Ala Cys Leu Ser Lys Arg Leu
      115      120      125
His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Cys Phe Thr Thr Leu
      130      135      140
Phe Met Val Val Thr Val Leu Gly Ala Ile Val Ala Ser Arg Cys His
      145      150      155      160
Gln Arg Pro Lys Leu Lys Lys Ser Leu Ala Leu Val Ile Ser Ala Thr
      165      170      175
Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr Phe Pro
      180      185      190
Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val Ile Leu
      195      200      205
Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala Val Ala
      210      215      220
Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys Ala Phe
      225      230      235      240
Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp Gln Met
      245      250      255
Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe
      260      265

```

<210> 31

<211> 257

<212> PRT

<213> *Drosophila melanogaster*

<400> 31

```

Lys Tyr Leu Leu Leu Glu Pro Ala Ala Leu Pro Ile Val Gly Leu Phe
  1      5      10      15
Val Leu Leu Ala Glu Leu Val Ile Asn Val Val Val Ile Gln Arg Val
      20      25      30
Pro Tyr Thr Glu Ile Asp Trp Val Ala Tyr Met Gln Glu Cys Glu Gly
      35      40      45
Phe Leu Asn Gly Thr Thr Asn Tyr Ser Leu Leu Arg Gly Asp Thr Gly
      50      55      60
Pro Leu Val Tyr Pro Ala Ala Phe Val Tyr Ile Tyr Ser Ala Leu Tyr
      65      70      75      80
Tyr Val Thr Ser His Gly Thr Asn Val Arg Leu Ala Gln Tyr Ile Phe
      85      90      95
Ala Gly Ile Tyr Leu Leu Gln Leu Ala Leu Val Leu Arg Leu Tyr Ser
      100      105      110
Lys Ser Arg Lys Val Pro Pro Tyr Val Leu Val Leu Ser Ala Phe Thr
      115      120      125
Ser Tyr Arg Ile His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Pro
      130      135      140

```

Val Ala Val Leu Leu Leu Tyr Ala Ala Leu Asn Leu Phe Leu Asp Arg
 145 150 155 160
 Arg Trp Thr Leu Gly Ser Thr Phe Phe Ser Leu Ala Val Gly Val Lys
 165 170 175
 Met Asn Ile Leu Leu Phe Ala Pro Ala Leu Leu Leu Phe Tyr Leu Ala
 180 185 190
 Asn Leu Gly Leu Leu Arg Thr Ile Leu Gln Leu Ala Val Cys Gly Val
 195 200 205
 Ile Gln Leu Leu Leu Gly Ala Pro Phe Leu Leu Thr His Pro Val Glu
 210 215 220
 Tyr Leu Arg Gly Ser Phe Asp Leu Gly Arg Ile Phe Glu His Lys Trp
 225 230 235 240
 Thr Val Asn Tyr Arg Phe Leu Ser Arg Asp Val Phe Glu Asn Arg Thr
 245 250 255
 Phe

<210> 32
 <211> 1377
 <212> DNA
 <213> *Saccharomyces cerevisiae*

<400> 32
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 agggccaatc ttatcgttat gccccttttg attttgttcg aaagcatgct gtgcaagatt 180
 atcattaaga aggtagctta cacagagatc gattacaagg cgtacatgga gcagatcgag 240
 atgattcagc tcgatggcat gctggactac tctcagggtga gtggtggaac gggcccgtcg 300
 gtgtatccag caggccacgt cttgatctac aagatgatgt actggctaac agaggggaatg 360
 gaccacgttg agcgcgggca agtggttttc agatacttgt atctccttac actggcggtta 420
 caaatggcgt gttactacct ttacatctta ccaccgtggt gtgtggtcctt ggcggtgcctc 480
 tctaaaagat tgcactctat ttacgtgcta cggttattca atgattgctt cactactttg 540
 tttatggtcg tcacggtttt gggggctatc gtggccagca ggtgccatca gcgccccaaa 600
 ttaaagaagt cccttgcgct ggtgatctcc gcaacataca gtatggctgt gagcattaag 660
 atgaatgcgc tgttgatatt ccctgcaatg atgatttctc tattcatcct taatgacgcg 720
 aacgtaatcc ttactttggt ggatctcggt gcgatgattg catggcaagt cgcagttgca 780
 gtgcccttcc tgcgcagctt tccgcaacag tacctgcatt gcgcttttaa tttcggcagg 840
 aagtttatgt accaatggag tatcaattgg caaatgatgg atgaagaggc tttcaatgat 900
 aagaggttcc acttggccct tttaatcagc cacctgatag cgctcaccac actgttcgtc 960
 acaagatacc ctgcgcatcct gcccgattta tgggtcttccc tgtgccatcc gctgaggaaa 1020
 aatgcagtg tcaatgccaa tcccgcgaag actattccat tcgttctaata cgcattccaac 1080
 ttcacgcggc tcctattttc aaggtccctc cactaccagt ttctatcctg gtatcactgg 1140
 actttgccta tactgatctt ttggtcggga atgcccttct tcgttgggtcc catttggtac 1200
 gtcttgacag agtgggtgctg gaattcctat ccaccaaact cacaagcaag cacgctattg 1260
 ttggcattga atactgttct gttgcttcta ttggccttga cgcagctatc tggttcggtc 1320
 gccctcgcca aaagccatct tcgtaccacc agctctatgg aaaaaaagct caactga 1377

<210> 33
 <211> 458
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 33
 Met Glu Gly Glu Gln Ser Pro Gln Gly Glu Lys Ser Leu Gln Arg Lys
 1 5 10 15
 Gln Phe Val Arg Pro Pro Leu Asp Leu Trp Gln Asp Leu Lys Asp Gly
 20 25 30

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Arg | Tyr | Val | Ile | Phe | Asp | Cys | Arg | Ala | Asn | Leu | Ile | Val | Met | Pro | 35 | 40 | 45 |
| Leu | Leu | Ile | Leu | Phe | Glu | Ser | Met | Leu | Cys | Lys | Ile | Ile | Ile | Lys | Lys | 50 | 55 | 60 |
| Val | Ala | Tyr | Thr | Glu | Ile | Asp | Tyr | Lys | Ala | Tyr | Met | Glu | Gln | Ile | Glu | 65 | 70 | 75 |
| Met | Ile | Gln | Leu | Asp | Gly | Met | Leu | Asp | Tyr | Ser | Gln | Val | Ser | Gly | Gly | 85 | 90 | 95 |
| Thr | Gly | Pro | Leu | Val | Tyr | Pro | Ala | Gly | His | Val | Leu | Ile | Tyr | Lys | Met | 100 | 105 | 110 |
| Met | Tyr | Trp | Leu | Thr | Glu | Gly | Met | Asp | His | Val | Glu | Arg | Gly | Gln | Val | 115 | 120 | 125 |
| Phe | Phe | Arg | Tyr | Leu | Tyr | Leu | Leu | Thr | Leu | Ala | Leu | Gln | Met | Ala | Cys | 130 | 135 | 140 |
| Tyr | Tyr | Leu | Leu | His | Leu | Pro | Pro | Trp | Cys | Val | Val | Leu | Ala | Cys | Leu | 145 | 150 | 155 |
| Ser | Lys | Arg | Leu | His | Ser | Ile | Tyr | Val | Leu | Arg | Leu | Phe | Asn | Asp | Cys | 165 | 170 | 175 |
| Phe | Thr | Thr | Leu | Phe | Met | Val | Val | Thr | Val | Leu | Gly | Ala | Ile | Val | Ala | 180 | 185 | 190 |
| Ser | Arg | Cys | His | Gln | Arg | Pro | Lys | Leu | Lys | Lys | Ser | Leu | Ala | Leu | Val | 195 | 200 | 205 |
| Ile | Ser | Ala | Thr | Tyr | Ser | Met | Ala | Val | Ser | Ile | Lys | Met | Asn | Ala | Leu | 210 | 215 | 220 |
| Leu | Tyr | Phe | Pro | Ala | Met | Met | Ile | Ser | Leu | Phe | Ile | Leu | Asn | Asp | Ala | 225 | 230 | 235 |
| Asn | Val | Ile | Leu | Thr | Leu | Leu | Asp | Leu | Val | Ala | Met | Ile | Ala | Trp | Gln | 245 | 250 | 255 |
| Val | Ala | Val | Ala | Val | Pro | Phe | Leu | Arg | Ser | Phe | Pro | Gln | Gln | Tyr | Leu | 260 | 265 | 270 |
| His | Cys | Ala | Phe | Asn | Phe | Gly | Arg | Lys | Phe | Met | Tyr | Gln | Trp | Ser | Ile | 275 | 280 | 285 |
| Asn | Trp | Gln | Met | Met | Asp | Glu | Glu | Ala | Phe | Asn | Asp | Lys | Arg | Phe | His | 290 | 295 | 300 |
| Leu | Ala | Leu | Leu | Ile | Ser | His | Leu | Ile | Ala | Leu | Thr | Thr | Leu | Phe | Val | 305 | 310 | 315 |
| Thr | Arg | Tyr | Pro | Arg | Ile | Leu | Pro | Asp | Leu | Trp | Ser | Ser | Leu | Cys | His | 325 | 330 | 335 |
| Pro | Leu | Arg | Lys | Asn | Ala | Val | Leu | Asn | Ala | Asn | Pro | Ala | Lys | Thr | Ile | 340 | 345 | 350 |
| Pro | Phe | Val | Leu | Ile | Ala | Ser | Asn | Phe | Ile | Gly | Val | Leu | Phe | Ser | Arg | 355 | 360 | 365 |
| Ser | Leu | His | Tyr | Gln | Phe | Leu | Ser | Trp | Tyr | His | Trp | Thr | Leu | Pro | Ile | 370 | 375 | 380 |
| Leu | Ile | Phe | Trp | Ser | Gly | Met | Pro | Phe | Phe | Val | Gly | Pro | Ile | Trp | Tyr | 385 | 390 | 395 |
| Val | Leu | His | Glu | Trp | Cys | Trp | Asn | Ser | Tyr | Pro | Pro | Asn | Ser | Gln | Ala | 405 | 410 | 415 |
| Ser | Thr | Leu | Leu | Leu | Ala | Leu | Asn | Thr | Val | Leu | Leu | Leu | Leu | Leu | Ala | 420 | 425 | 430 |
| Leu | Thr | Gln | Leu | Ser | Gly | Ser | Val | Ala | Leu | Ala | Lys | Ser | His | Leu | Arg | 435 | 440 | 445 |
| Thr | Thr | Ser | Ser | Met | Glu | Lys | Lys | Leu | Asn | | | | | | | 450 | 455 | |

<210> 34

<211> 1395

<212> DNA

<213> *Pichia pastoris*

<400> 34

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cttttatggt tagctgattc cattgttatc aaggatgatc ttggcactgt ttcctacaca 180
gatattgatt tttcttcata tatgcaacaa atctttaaaa ttcgacaagg agaattagat 240
tatagcaaca tatttggtga caccgggtcca ttgggtttacc cagccggcca tgttcacgct 300
tactcagtac tttcgtggta cagtgatggt ggagaagacg tcagtttcgt tcaacaagca 360
tttggttggt tatacctagg ttgcttggtta ctatccatca gctcctactt tttctctggc 420
ttagggaaaa tacctccggt ttattttggt ttggttggtag cgtccaagag actgcattca 480
atatattgtat tgagactcct caatgactgt ttaacaacat ttttgatggt ggcaactata 540
atcatccttc aacaagcaag tagctggagg aaagatggca caactattcc attatctgtc 600
cctgatgctg cagatacgtc cagtttagcc atctctgtaa agatgaatgc gctgctatac 660
ctcccagcat tcctactact catatatctc atttgtgacg aaaatttgat taaagccttg 720
gcacctgttc tagttttgat attggtgcaa gtaggagtcg gttattcggt cattttaccg 780
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gacattttca aattttggaa gccaacctta tctccaacca atattatcaa cgaccagaa 1080
agaagccagc attttgttta caccgtcatg gctactacca acttaatagg ggtgcttttt 1140
gcaagatcct tacactacca gttcctaagc tggtatgcgt tctctttgcc atatctcctt 1200
tacaaggctc gtctgaactt tatagcatct attattggtt atgccgctca cgagtattgc 1260
tggttggttt tcccagctac agaacaaagt tccgcgttgt tggtatctat cttactactt 1320
atcctgattc tcattttttac caacgaacag ttatttcctt ctcaatcggg ccctgcagaa 1380
aaaaagaata cataa 1395

```

<210> 35

<211> 464

<212> PRT

<213> *Pichia pastoris*

<400> 35

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Met Pro Pro Ile Glu Pro Ala Glu Arg Pro Lys Leu Thr Leu Lys Asn
 1           5           10           15
Val Ile Gly Asp Leu Val Ala Leu Ile Gln Asn Val Leu Phe Asn Pro
 20           25           30
Asp Phe Ser Val Phe Val Ala Pro Leu Leu Trp Leu Ala Asp Ser Ile
 35           40           45
Val Ile Lys Val Ile Ile Gly Thr Val Ser Tyr Thr Asp Ile Asp Phe
 50           55           60
Ser Ser Tyr Met Gln Gln Ile Phe Lys Ile Arg Gln Gly Glu Leu Asp
 65           70           75           80
Tyr Ser Asn Ile Phe Gly Asp Thr Gly Pro Leu Val Tyr Pro Ala Gly
 85           90           95
His Val His Ala Tyr Ser Val Leu Ser Trp Tyr Ser Asp Gly Gly Glu
100           105           110
Asp Val Ser Phe Val Gln Gln Ala Phe Gly Trp Leu Tyr Leu Gly Cys
115           120           125
Leu Leu Leu Ser Ile Ser Ser Tyr Phe Phe Ser Gly Leu Gly Lys Ile
130           135           140
Pro Pro Val Tyr Phe Val Leu Leu Val Ala Ser Lys Arg Leu His Ser
145           150           155           160
Ile Phe Val Leu Arg Leu Phe Asn Asp Cys Leu Thr Thr Phe Leu Met
165           170           175
Leu Ala Thr Ile Ile Ile Leu Gln Gln Ala Ser Ser Trp Arg Lys Asp

```

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| | | | | 180 | | | | | | 185 | | | | | 190 | | | | |
| Gly | Thr | Thr | Ile | Pro | Leu | Ser | Val | Pro | Asp | Ala | Ala | Asp | Thr | Tyr | Ser | | | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | | | |
| Leu | Ala | Ile | Ser | Val | Lys | Met | Asn | Ala | Leu | Leu | Tyr | Leu | Pro | Ala | Phe | | | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | | | |
| Leu | Leu | Leu | Ile | Tyr | Leu | Ile | Cys | Asp | Glu | Asn | Leu | Ile | Lys | Ala | Leu | | | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | | | |
| Ala | Pro | Val | Leu | Val | Leu | Ile | Leu | Val | Gln | Val | Gly | Val | Gly | Tyr | Ser | | | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | | | |
| Phe | Ile | Leu | Pro | Leu | His | Tyr | Asp | Asp | Gln | Ala | Asn | Glu | Ile | Arg | Ser | | | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | | | |
| Ala | Tyr | Phe | Arg | Gln | Ala | Phe | Asp | Phe | Ser | Arg | Gln | Phe | Leu | Tyr | Lys | | | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | | | |
| Trp | Thr | Val | Asn | Trp | Arg | Phe | Leu | Ser | Gln | Glu | Thr | Phe | Asn | Asn | Val | | | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | | | |
| His | Phe | His | Gln | Leu | Leu | Phe | Ala | Leu | His | Ile | Ile | Thr | Leu | Val | Leu | | | | |
| 305 | | | | 310 | | | | | | 315 | | | | | 320 | | | | |
| Phe | Ile | Leu | Lys | Phe | Leu | Ser | Pro | Lys | Asn | Ile | Gly | Lys | Pro | Leu | Gly | | | | |
| | | | | 325 | | | | | 330 | | | | | 335 | | | | | |
| Arg | Phe | Val | Leu | Asp | Ile | Phe | Lys | Phe | Trp | Lys | Pro | Thr | Leu | Ser | Pro | | | | |
| | | | 340 | | | | | 345 | | | | | 350 | | | | | | |
| Thr | Asn | Ile | Ile | Asn | Asp | Pro | Glu | Arg | Ser | Pro | Asp | Phe | Val | Tyr | Thr | | | | |
| | | 355 | | | | | 360 | | | | | 365 | | | | | | | |
| Val | Met | Ala | Thr | Thr | Asn | Leu | Ile | Gly | Val | Leu | Phe | Ala | Arg | Ser | Leu | | | | |
| | 370 | | | | | 375 | | | | | 380 | | | | | | | | |
| His | Tyr | Gln | Phe | Leu | Ser | Trp | Tyr | Ala | Phe | Ser | Leu | Pro | Tyr | Leu | Leu | | | | |
| 385 | | | | 390 | | | | | | 395 | | | | | 400 | | | | |
| Tyr | Lys | Ala | Arg | Leu | Asn | Phe | Ile | Ala | Ser | Ile | Ile | Val | Tyr | Ala | Ala | | | | |
| | | | | 405 | | | | | 410 | | | | | 415 | | | | | |
| His | Glu | Tyr | Cys | Trp | Leu | Val | Phe | Pro | Ala | Thr | Glu | Gln | Ser | Ser | Ala | | | | |
| | | | 420 | | | | | 425 | | | | | 430 | | | | | | |
| Leu | Leu | Val | Ser | Ile | Leu | Leu | Leu | Ile | Leu | Ile | Leu | Ile | Phe | Thr | Asn | | | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | | | |
| Glu | Gln | Leu | Phe | Pro | Ser | Gln | Ser | Val | Pro | Ala | Glu | Lys | Lys | Asn | Thr | | | | |
| | 450 | | | | | 455 | | | | | 460 | | | | | | | | |

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<210> 36
<211> 418
<212> PRT
<213> Pichia pastoris
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<220>
<221> MUTAGEN
<222> (209)...(223)
<223> Xaa is a variable amino acid
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```
<220>
<221> MOD_RES
<222> (235)...(246)
<223> Xaa is a variable amino acid
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<400> 36
Arg Pro Lys Leu Thr Leu Lys Asn Val Ile Gly Asp Leu Val Ala Leu
  1           5           10           15
Ile Gln Asn Val Leu Phe Asn Pro Asp Phe Ser Val Phe Val Ala Pro
      20           25           30
Leu Leu Trp Leu Ala Asp Ser Ile Val Ile Lys Val Ile Ile Gly Thr

```


| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 35 | | | | 40 | | | | 45 | | | | | |
| Val | Ser | Tyr | Thr | Asp | Ile | Asp | Phe | Ser | Ser | Tyr | Met | Gln | Gln | Ile | Phe |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Lys | Ile | Arg | Gln | Gly | Glu | Leu | Asp | Tyr | Ser | Asn | Ile | Phe | Gly | Asp | Thr |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Gly | Pro | Leu | Val | Tyr | Pro | Ala | Gly | His | Val | His | Ala | Tyr | Ser | Val | Leu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ser | Trp | Tyr | Ser | Asp | Gly | Gly | Glu | Asp | Val | Ser | Phe | Val | Gln | Gln | Ala |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Phe | Gly | Trp | Leu | Tyr | Leu | Gly | Cys | Leu | Leu | Leu | Ser | Ile | Ser | Ser | Tyr |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Phe | Phe | Ser | Gly | Leu | Gly | Lys | Ile | Pro | Pro | Val | Tyr | Phe | Val | Leu | Leu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Val | Ala | Ser | Lys | Arg | Leu | His | Ser | Ile | Phe | Val | Leu | Arg | Leu | Phe | Asn |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Asp | Cys | Leu | Thr | Thr | Phe | Leu | Met | Leu | Ala | Thr | Ile | Ile | Ile | Leu | Gln |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Gln | Ala | Ser | Ser | Trp | Arg | Lys | Asp | Gly | Thr | Thr | Ile | Pro | Leu | Ser | Val |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Pro | Asp | Ala | Ala | Asp | Thr | Tyr | Ser | Leu | Ala | Ile | Ser | Val | Lys | Met | Asn |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Cys |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Asp | Glu | Asn | Leu | Ile | Lys | Ala | Leu | Ala | Pro | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Tyr | Ser | Phe | Ile | Leu | Pro | Leu | His | Tyr | Asp |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Asp | Gln | Ala | Asn | Glu | Ile | Arg | Ser | Ala | Tyr | Phe | Arg | Gln | Ala | Phe | Asp |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Phe | Ser | Arg | Gln | Phe | Leu | Tyr | Lys | Trp | Thr | Val | Asn | Trp | Arg | Phe | Leu |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Ser | Gln | Glu | Thr | Phe | Asn | Asn | Val | His | Phe | His | Gln | Leu | Leu | Phe | Ala |
| | | 290 | | | | 295 | | | | | 300 | | | | |
| Leu | His | Ile | Ile | Thr | Leu | Val | Leu | Phe | Ile | Leu | Lys | Phe | Leu | Ser | Pro |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Lys | Asn | Ile | Gly | Lys | Pro | Leu | Gly | Arg | Phe | Val | Leu | Asp | Ile | Phe | Lys |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Phe | Trp | Lys | Pro | Thr | Leu | Ser | Pro | Thr | Asn | Ile | Ile | Asn | Pro | Asp | Phe |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Val | Tyr | Thr | Val | Met | Ala | Thr | Thr | Asn | Leu | Ile | Gly | Val | Leu | Phe | Ala |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Arg | Ser | Leu | His | Tyr | Gln | Phe | Leu | Ser | Trp | Tyr | Ala | Phe | Ser | Leu | Pro |
| | | 370 | | | | 375 | | | | | 380 | | | | |
| Tyr | Leu | Leu | Tyr | Lys | Ala | Arg | Leu | Asn | Phe | Ile | Ala | Ser | Ile | Ile | Val |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Tyr | Ala | Ala | His | Glu | Tyr | Cys | Trp | Leu | Val | Phe | Pro | Ala | Thr | Glu | Gln |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Ser | Ser | | | | | | | | | | | | | | |

<210> 37

<211> 398

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 37

Arg Pro Pro Leu Asp Leu Trp Gln Asp Leu Lys Asp Gly Val Arg Tyr

| | | | |
|---|-----|-----|-----|
| 1 | 5 | 10 | 15 |
| Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro Leu Leu Ile | | | |
| 20 | 25 | 30 | |
| Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys Val Ala Tyr | | | |
| 35 | 40 | 45 | |
| Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu Met Ile Gln | | | |
| 50 | 55 | 60 | |
| Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly Thr Gly Pro | | | |
| 65 | 70 | 75 | 80 |
| Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met Met Tyr Trp | | | |
| 85 | 90 | 95 | |
| Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val Phe Phe Arg | | | |
| 100 | 105 | 110 | |
| Tyr Leu Tyr Leu Leu Thr Leu Ala Leu Gln Met Ala Cys Tyr Tyr Leu | | | |
| 115 | 120 | 125 | |
| Leu His Leu Pro Pro Trp Cys Val Val Leu Ala Cys Leu Ser Lys Arg | | | |
| 130 | 135 | 140 | |
| Leu His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Cys Phe Thr Thr | | | |
| 145 | 150 | 155 | 160 |
| Leu Phe Met Val Val Thr Val Leu Gly Ala Ile Val Ala Ser Arg Cys | | | |
| 165 | 170 | 175 | |
| His Gln Arg Pro Lys Leu Lys Lys Ser Leu Ala Leu Val Ile Ser Ala | | | |
| 180 | 185 | 190 | |
| Thr Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr Phe | | | |
| 195 | 200 | 205 | |
| Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val Ile | | | |
| 210 | 215 | 220 | |
| Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala Val | | | |
| 225 | 230 | 235 | 240 |
| Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys Ala | | | |
| 245 | 250 | 255 | |
| Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp Gln | | | |
| 260 | 265 | 270 | |
| Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe His Leu Ala Leu | | | |
| 275 | 280 | 285 | |
| Leu Ile Ser His Leu Ile Ala Leu Thr Thr Leu Phe Val Thr Arg Tyr | | | |
| 290 | 295 | 300 | |
| Pro Arg Ile Leu Pro Asp Leu Trp Ser Ser Leu Cys His Pro Leu Arg | | | |
| 305 | 310 | 315 | 320 |
| Lys Asn Ala Val Leu Asn Ala Asn Pro Ala Lys Thr Ile Pro Phe Val | | | |
| 325 | 330 | 335 | |
| Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser Arg Ser Leu His | | | |
| 340 | 345 | 350 | |
| Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile Leu Ile Phe | | | |
| 355 | 360 | 365 | |
| Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr Val Leu His | | | |
| 370 | 375 | 380 | |
| Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser Gln Ala Ser | | | |
| 385 | 390 | 395 | |

<210> 38

<211> 387

<212> PRT

<213> Pichia pastoris

<220>

<221> MOD_RES

<222> (183)...(197)

<223> Xaa is a variable amino acid

<220>

<221> MOD_RES

<222> (209)...(220)

<223> Xaa is a variable amino acid

<400> 38

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Ser Val Phe Val Ala Pro Leu Leu Trp Leu Ala Asp Ser Ile Val Ile
 1          5          10          15
Lys Val Ile Ile Gly Thr Val Ser Tyr Thr Asp Ile Asp Phe Ser Ser
          20          25          30
Tyr Met Gln Gln Ile Phe Lys Ile Arg Gln Gly Glu Leu Asp Tyr Ser
          35          40          45
Asn Ile Phe Gly Asp Thr Gly Pro Leu Val Tyr Pro Ala Gly His Val
          50          55          60
His Ala Tyr Ser Val Leu Ser Trp Tyr Ser Asp Gly Gly Glu Asp Val
          65          70          75          80
Ser Phe Val Gln Gln Ala Phe Gly Trp Leu Tyr Leu Gly Cys Leu Leu
          85          90          95
Leu Ser Ile Ser Ser Tyr Phe Phe Ser Gly Leu Gly Lys Ile Pro Pro
          100          105          110
Val Tyr Phe Val Leu Leu Val Ala Ser Lys Arg Leu His Ser Ile Phe
          115          120          125
Val Leu Arg Leu Phe Asn Asp Cys Leu Thr Thr Phe Leu Met Leu Ala
          130          135          140
Thr Ile Ile Ile Leu Gln Gln Ala Ser Ser Trp Arg Lys Asp Gly Thr
          145          150          155          160
Thr Ile Pro Leu Ser Val Pro Asp Ala Ala Asp Thr Tyr Ser Leu Ala
          165          170          175
Ile Ser Val Lys Met Asn Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          180          185          190
Xaa Xaa Xaa Xaa Xaa Cys Asp Glu Asn Leu Ile Lys Ala Leu Ala Pro
          195          200          205
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Ser Phe Ile
          210          215          220
Leu Pro Leu His Tyr Asp Asp Gln Ala Asn Glu Ile Arg Ser Ala Tyr
          225          230          235          240
Phe Arg Gln Ala Phe Asp Phe Ser Arg Gln Phe Leu Tyr Lys Trp Thr
          245          250          255
Val Asn Trp Arg Phe Leu Ser Gln Glu Thr Phe Asn Asn Val His Phe
          260          265          270
His Gln Leu Leu Phe Ala Leu His Ile Ile Thr Leu Val Leu Phe Ile
          275          280          285
Pro Leu Gly Arg Phe Val Leu Asp Ile Phe Lys Phe Trp Lys Pro Thr
          290          295          300
Leu Ser Pro Thr Asn Ile Ile Asn Asp Pro Glu Arg Ser Pro Asp Phe
          305          310          315          320
Val Tyr Thr Val Met Ala Thr Thr Asn Leu Ile Gly Val Leu Phe Ala
          325          330          335
Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr Ala Phe Ser Leu Pro
          340          345          350
Tyr Leu Leu Tyr Lys Ala Arg Leu Asn Phe Ile Ala Ser Ile Ile Val
          355          360          365
Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro Ala Thr Glu Gln
          370          375          380
Ser Ser Ala

```

385

<210> 39
 <211> 373
 <212> PRT
 <213> Neurospora crassa

<400> 39

```

Ser Lys Leu Ile Pro Pro Ala Leu Phe Leu Val Asp Ala Leu Leu Cys
 1          5          10          15
Gly Leu Ile Ile Trp Lys Val Pro Tyr Thr Glu Ile Asp Trp Ala Ala
 20          25          30
Tyr Met Glu Gln Val Ser Gln Ile Leu Ser Gly Glu Arg Asp Tyr Thr
 35          40          45
Lys Val Arg Gly Gly Thr Gly Pro Leu Val Tyr Pro Ala Ala His Val
 50          55          60
Tyr Ile Tyr Thr Gly Leu Tyr His Leu Thr Asp Glu Gly Arg Asn Ile
 65          70          75          80
Leu Leu Ala Gln Gln Leu Phe Ala Gly Leu Tyr Met Val Thr Leu Ala
 85          90          95
Val Val Met Gly Cys Tyr Trp Gln Ala Lys Ala Pro Pro Tyr Leu Phe
100          105          110
Pro Leu Leu Thr Leu Ser Lys Arg Leu His Ser Ile Phe Val Leu Arg
115          120          125
Cys Phe Asn Asp Cys Phe Ala Val Leu Phe Leu Trp Leu Ala Ile Phe
130          135          140
Phe Phe Gln Arg Arg Asn Trp Gln Ala Gly Ala Leu Leu Tyr Thr Leu
145          150          155          160
Gly Leu Gly Val Lys Met Thr Leu Leu Leu Ser Leu Pro Ala Val Gly
165          170          175
Ile Val Leu Phe Leu Gly Ser Gly Ser Phe Val Thr Thr Leu Gln Leu
180          185          190
Val Ala Thr Met Gly Leu Val Gln Ile Leu Ile Gly Val Pro Phe Leu
195          200          205
Ala His Tyr Pro Thr Glu Tyr Leu Ser Arg Ala Phe Glu Leu Ser Arg
210          215          220
Gln Phe Phe Phe Lys Trp Thr Val Asn Trp Arg Phe Val Gly Glu Glu
225          230          235          240
Ile Phe Leu Ser Lys Gly Phe Ala Leu Thr Leu Leu Ala Leu His Val
245          250          255
Leu Val Leu Gly Ile Phe Ile Thr Thr Arg Trp Ile Lys Pro Ala Arg
260          265          270
Lys Ser Leu Val Gln Leu Ile Ser Pro Val Leu Leu Ala Gly Lys Pro
275          280          285
Pro Leu Thr Val Pro Glu His Arg Ala Ala Ala Arg Asp Val Thr Pro
290          295          300
Arg Tyr Ile Met Thr Thr Ile Leu Ser Ala Asn Ala Val Gly Leu Leu
305          310          315          320
Phe Ala Arg Ser Leu His Tyr Gln Phe Tyr Ala Tyr Val Ala Trp Ser
325          330          335
Thr Pro Phe Leu Leu Trp Arg Ala Gly Leu His Pro Val Leu Val Tyr
340          345          350
Leu Leu Trp Ala Val His Glu Trp Ala Trp Asn Val Phe Pro Ser Thr
355          360          365
Pro Ala Ser Ser Ala
370

```

<210> 40
 <211> 374
 <212> PRT
 <213> *Pichia pastoris*

<220>
 <221> MOD_RES
 <222> (160)...(174)
 <223> Xaa is a variable amino acid

<220>
 <221> MOD_RES
 <222> (186)...(197)
 <223> Xaa is a variable amino acid

<400> 40
 Ser Tyr Thr Asp Ile Asp Phe Ser Ser Tyr Met Gln Gln Ile Phe Lys
 1 5 10 15
 Ile Arg Gln Gly Glu Leu Asp Tyr Ser Asn Ile Phe Gly Asp Thr Gly
 20 25 30
 Pro Leu Val Tyr Pro Ala Gly His Val His Ala Tyr Ser Val Leu Ser
 35 40 45
 Trp Tyr Ser Asp Gly Gly Glu Asp Val Ser Phe Val Gln Gln Ala Phe
 50 55 60
 Gly Trp Leu Tyr Leu Gly Cys Leu Leu Leu Ser Ile Ser Ser Tyr Phe
 65 70 75 80
 Phe Ser Gly Leu Gly Lys Ile Pro Pro Val Tyr Phe Val Leu Leu Val
 85 90 95
 Ala Ser Lys Arg Leu His Ser Ile Phe Val Leu Arg Leu Phe Asn Asp
 100 105 110
 Cys Leu Thr Thr Phe Leu Met Leu Ala Thr Ile Ile Ile Leu Gln Gln
 115 120 125
 Ala Ser Ser Trp Arg Lys Asp Gly Thr Thr Ile Pro Leu Ser Val Pro
 130 135 140
 Asp Ala Ala Asp Thr Tyr Ser Leu Ala Ile Ser Val Lys Met Asn Xaa
 145 150 155 160
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Asp
 165 170 175
 Glu Asn Leu Ile Lys Ala Leu Ala Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 180 185 190
 Xaa Xaa Xaa Xaa Xaa Tyr Ser Phe Ile Leu Pro Leu His Tyr Asp Asp
 195 200 205
 Gln Ala Asn Glu Ile Arg Ser Ala Tyr Phe Arg Gln Ala Phe Asp Phe
 210 215 220
 Ser Arg Gln Phe Leu Tyr Lys Trp Thr Val Asn Trp Arg Phe Leu Ser
 225 230 235 240
 Gln Glu Thr Phe Asn Asn Val His Phe His Gln Leu Leu Phe Ala Leu
 245 250 255
 His Ile Ile Thr Leu Val Leu Phe Ile Leu Lys Phe Leu Ser Pro Lys
 260 265 270
 Asn Ile Gly Lys Pro Leu Gly Arg Phe Val Leu Asp Ile Phe Lys Phe
 275 280 285
 Trp Lys Pro Thr Leu Ser Pro Thr Asn Ile Ile Asn Asp Pro Glu Arg
 290 295 300
 Ser Pro Asp Phe Val Tyr Thr Val Met Ala Thr Thr Asn Leu Ile Gly
 305 310 315 320
 Val Leu Phe Ala Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr Ala

325 330 335
 Phe Ser Leu Pro Tyr Leu Leu Tyr Lys Ala Arg Leu Asn Phe Ile Ala
 340 345 350
 Ser Ile Ile Val Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro
 355 360 365
 Ala Thr Glu Gln Ser Ser
 370

<210> 41
 <211> 355
 <212> PRT
 <213> Schizosaccharomyces pombe

<400> 41
 Leu Leu Leu Leu Glu Ile Pro Phe Val Phe Ala Ile Ile Ser Lys Val
 1 5 10 15
 Pro Tyr Thr Glu Ile Asp Trp Ile Ala Tyr Met Glu Gln Val Asn Ser
 20 25 30
 Phe Leu Leu Gly Glu Arg Asp Tyr Lys Ser Leu Val Gly Cys Thr Gly
 35 40 45
 Pro Leu Val Tyr Pro Gly Gly His Val Phe Leu Tyr Thr Leu Leu Tyr
 50 55 60
 Tyr Leu Thr Asp Gly Gly Thr Asn Ile Val Arg Ala Gln Tyr Ile Phe
 65 70 75 80
 Ala Phe Val Tyr Trp Ile Thr Thr Ala Ile Val Gly Tyr Leu Phe Lys
 85 90 95
 Ile Val Arg Ala Pro Phe Tyr Ile Tyr Val Leu Leu Ile Leu Ser Lys
 100 105 110
 Arg Leu His Ser Ile Phe Ile Leu Arg Leu Phe Asn Asp Gly Phe Asn
 115 120 125
 Ser Leu Phe Ser Ser Leu Phe Ile Leu Ser Ser Cys Lys Lys Lys Trp
 130 135 140
 Val Arg Ala Ser Ile Leu Leu Ser Val Ala Cys Ser Val Lys Met Ser
 145 150 155 160
 Ser Leu Leu Tyr Val Pro Ala Tyr Leu Val Leu Leu Leu Gln Ile Leu
 165 170 175
 Gly Pro Lys Lys Thr Trp Met His Ile Phe Val Ile Ile Ile Val Gln
 180 185 190
 Ile Leu Phe Ser Ile Pro Phe Leu Ala Tyr Phe Trp Ser Tyr Trp Thr
 195 200 205
 Gln Ala Phe Asp Phe Gly Arg Ala Phe Asp Tyr Lys Trp Thr Val Asn
 210 215 220
 Trp Arg Phe Ile Pro Arg Ser Ile Phe Glu Ser Thr Ser Phe Ser Thr
 225 230 235 240
 Ser Ile Leu Phe Leu His Val Ala Leu Leu Val Ala Phe Thr Cys Lys
 245 250 255
 His Trp Asn Lys Leu Ser Arg Ala Thr Pro Phe Ala Met Val Asn Ser
 260 265 270
 Met Leu Thr Leu Lys Pro Leu Pro Lys Leu Gln Leu Ala Thr Pro Asn
 275 280 285
 Phe Ile Phe Thr Ala Leu Ala Thr Ser Asn Leu Ile Gly Ile Leu Cys
 290 295 300
 Ala Arg Ser Leu His Tyr Gln Phe Tyr Ala Trp Phe Ala Trp Tyr Ser
 305 310 315 320
 Pro Tyr Leu Cys Tyr Gln Ala Ser Phe Pro Ala Pro Ile Val Ile Gly
 325 330 335
 Leu Trp Met Leu Gln Glu Tyr Ala Trp Asn Val Phe Pro Ser Thr Lys

Leu Ser Ser 340 345 350

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<210> 42
<211> 390
<212> PRT
<213> Pichia pastoris
```

```
<220>
<221> MOD_RES
<222> (176)...(190)
<223> Xaa is a variable amino acid
```

```
<220>  
<221> MOD_RES  
<222> (202)...(213)  
<223> Xaa is a variable amino acid
```

<400> 42

| | | | | | | | | | | | | | | | |
|------------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Leu 1 | Trp | Leu | Ala | Asp 5 | Ser | Ile | Val | Ile | Lys 10 | Val | Ile | Ile | Gly | Thr 15 | Val |
| Ser | Tyr | Thr | Asp 20 | Ile | Asp | Phe | Ser | Ser 25 | Tyr | Met | Gln | Gln | Ile 30 | Phe | Lys |
| Ile | Arg | Gln | Gly 35 | Glu | Leu | Asp | Tyr 40 | Ser | Asn | Ile | Phe | Gly 45 | Asp | Thr | Gly |
| Pro | Leu 50 | Val | Tyr | Pro | Ala | Gly 55 | His | Val | His | Ala | Tyr 60 | Ser | Val | Leu | Ser |
| Trp 65 | Tyr | Ser | Asp | Gly 70 | Gly | Glu | Asp | Val | Ser | Phe 75 | Val | Gln | Gln | Ala | Phe 80 |
| Gly | Trp | Leu | Tyr | Leu 85 | Gly | Cys | Leu | Leu | Leu 90 | Ser | Ile | Ser | Ser | Tyr 95 | Phe |
| Phe | Ser | Gly | Leu 100 | Gly | Lys | Ile | Pro | Pro 105 | Val | Tyr | Phe | Val | Leu | Leu | Val |
| Ala | Ser | Lys 115 | Arg | Leu | His | Ser | Ile 120 | Phe | Val | Leu | Arg | Leu 125 | Phe | Asn | Asp |
| Cys | Leu 130 | Thr | Thr | Phe | Leu | Met 135 | Leu | Ala | Thr | Ile | Ile 140 | Ile | Leu | Gln | Gln |
| Ala 145 | Ser | Ser | Trp | Arg | Lys 150 | Asp | Gly | Thr | Thr | Ile 155 | Pro | Leu | Ser | Val | Pro 160 |
| Asp | Ala | Ala | Asp 165 | Thr | Tyr | Ser | Leu | Ala 170 | Ile | Ser | Val | Lys | Met | Asn 175 | Xaa |
| Xaa | Xaa | Xaa 180 | Xaa | Xaa | Xaa | Xaa | Xaa 185 | Xaa | Xaa | Xaa | Xaa | Xaa 190 | Xaa | Cys | Asp |
| Glu | Asn | Leu 195 | Ile | Lys | Ala | Leu | Ala 200 | Pro | Xaa | Xaa | Xaa | Xaa 205 | Xaa | Xaa | Xaa |
| Xaa | Xaa 210 | Xaa | Xaa | Xaa | Tyr | Ser 215 | Phe | Ile | Leu | Pro | Leu 220 | His | Tyr | Asp | Asp |
| Gln 225 | Ala | Asn | Glu | Ile | Arg 230 | Ser | Ala | Tyr | Phe | Arg 235 | Gln | Ala | Phe | Asp | Phe 240 |
| Ser | Arg | Gln | Phe 245 | Leu | Tyr | Lys | Trp | Thr | Val 250 | Asn | Trp | Arg | Phe | Leu | Ser |
| Gln | Glu | Thr | Phe 260 | Asn | Asn | Val | His | Phe 265 | His | Gln | Leu | Leu | Phe 270 | Ala | Leu |
| His | Ile | Ile 275 | Thr | Leu | Val | Leu | Phe 280 | Ile | Leu | Lys | Phe | Leu 285 | Ser | Pro | Lys |
| Asn | Ile | Gly | Lys | Pro | Leu | Gly | Arg | Phe | Val | Leu | Asp | Ile | Phe | Lys | Phe |

| | | |
|-------------------------|---------------------|---------------------|
| 290 | 295 | 300 |
| Trp Lys Pro Thr Leu Ser | Pro Thr Asn Ile Ile | Asn Asp Pro Glu Arg |
| 305 | 310 | 315 |
| Ser Pro Asp Phe Val Tyr | Thr Val Met Ala Thr | Thr Asn Leu Ile Gly |
| | 325 | 330 |
| Val Leu Phe Ala Arg Ser | Leu His Tyr Gln Phe | Leu Ser Trp Tyr Ala |
| | 340 | 345 |
| Phe Ser Leu Pro Tyr Leu | Leu Tyr Lys Ala Arg | Leu Asn Phe Ile Ala |
| | 355 | 360 |
| Ser Ile Ile Val Tyr Ala | Ala His Glu Tyr Cys | Trp Leu Val Phe Pro |
| 370 | 375 | 380 |
| Ala Thr Glu Gln Ser Ser | | |
| 385 | 390 | |

<210> 43

<211> 363

<212> PRT

<213> Arabidopsis thaliana

<400> 43

| | |
|---|-----|
| Leu Ile Leu Ala Asp Ala Ile Leu Val Ala Leu Ile Ile Ala Tyr Val | |
| 1 | 5 |
| Pro Tyr Thr Lys Ile Asp Trp Asp Ala Tyr Met Ser Gln Val Ser Gly | 10 |
| | 20 |
| Phe Leu Gly Gly Glu Arg Asp Tyr Gly Asn Leu Lys Gly Asp Thr Gly | 25 |
| | 35 |
| Pro Leu Val Tyr Pro Ala Gly Phe Leu Tyr Val Tyr Ser Ala Val Gln | 40 |
| | 50 |
| Asn Leu Thr Gly Gly Glu Val Tyr Pro Ala Gln Ile Leu Phe Gly Val | 55 |
| | 65 |
| Leu Tyr Ile Val Asn Leu Gly Ile Val Leu Ile Ile Tyr Val Lys Thr | 70 |
| | 85 |
| Asp Val Val Pro Trp Trp Ala Leu Ser Leu Leu Cys Leu Ser Lys Arg | 90 |
| | 100 |
| Ile His Ser Ile Phe Val Leu Arg Leu Phe Asn Asp Cys Phe Ala Met | 105 |
| | 115 |
| Thr Leu Leu His Ala Ser Met Ala Leu Phe Leu Tyr Arg Lys Trp His | 120 |
| | 130 |
| Leu Gly Met Leu Val Phe Ser Gly Ala Val Ser Val Lys Met Asn Val | 135 |
| | 145 |
| Leu Leu Tyr Ala Pro Thr Leu Leu Leu Leu Lys Ala Met Asn | 150 |
| | 165 |
| Ile Ile Gly Val Val Ser Ala Leu Ala Gly Ala Ala Leu Ala Gln Ile | 170 |
| | 180 |
| Leu Val Gly Leu Pro Phe Leu Ile Thr Tyr Pro Val Ser Tyr Ile Ala | 185 |
| | 195 |
| Asn Ala Phe Asp Leu Gly Arg Val Phe Ile His Phe Trp Ser Val Asn | 200 |
| | 210 |
| Phe Lys Phe Val Pro Glu Arg Val Phe Val Ser Lys Glu Phe Ala Val | 215 |
| | 225 |
| Cys Leu Leu Ile Ala His Leu Phe Leu Leu Val Ala Phe Ala Asn Tyr | 230 |
| | 245 |
| Lys Trp Cys Lys His Glu Gly Gly Ile Ile Gly Phe Met Arg Ser Arg | 250 |
| | 260 |
| His Phe Phe Leu Thr Leu Pro Ser Ser Leu Ser Phe Ser Asp Val Ser | 265 |
| | 275 |
| Ala Ser Arg Ile Ile Thr Lys Glu His Val Val Thr Ala Met Phe Val | 280 |
| | 285 |

| | | | | |
|---|-----|-----|-----|-----|
| 290 | | 295 | | 300 |
| Gly Asn Phe Ile Gly Ile Val Phe Ala Arg Ser Leu His Tyr Gln Phe | | | | |
| 305 | | 310 | | 315 |
| Tyr Ser Trp Tyr Phe Tyr Ser Leu Pro Tyr Leu Leu Trp Arg Thr Pro | | | | |
| | 325 | | 330 | 335 |
| Phe Pro Thr Trp Leu Arg Leu Ile Met Phe Leu Gly Ile Glu Leu Cys | | | | |
| | 340 | | 345 | 350 |
| Trp Asn Val Tyr Pro Ser Thr Pro Ser Ser Ser | | | | |
| | 355 | | 360 | |

<210> 44
 <211> 428
 <212> DNA
 <213> Kluyveromyces lactis

<400> 44
 tttgtttaca agctgatacc aacgaacatg aatacaccgg cagggtttact gaagattggc 60
 aaagctaacc ttttacatcc ttttaccgat gctgtattca gtgcatgag agtaaacgca 120
 gaacaaattg catacatttt acttggttacc aattacattg gagtactatt tgctcgatca 180
 ttacactacc aattcctatc ttggtacatc tggacgttac cagtactatt gaattgggcc 240
 aatgttccgt atccgctatg tgtgctatgg tacctaacac atgagtgggtg ctggaacagc 300
 tatccgccaac acgctactgc atccacactg ctacacgcgt gtaacacata ctgttattgg 360
 ctgtattctt aagaggaccc gcaaactcga aaagtgggtga taacgaaaca acacacgaga 420
 aagctgag 428

<210> 45
 <211> 141
 <212> PRT
 <213> Kluyveromyces lactis

<400> 45
 Phe Val Tyr Lys Leu Ile Pro Thr Asn Met Asn Thr Pro Ala Gly Leu
 1 5 10 15
 Leu Lys Ile Gly Lys Ala Asn Leu Leu His Pro Phe Thr Asp Ala Val
 20 25 30
 Phe Ser Ala Met Arg Val Asn Ala Glu Gln Ile Ala Tyr Ile Leu Leu
 35 40 45
 Val Thr Asn Tyr Ile Gly Val Leu Phe Ala Arg Ser Leu His Tyr Gln
 50 55 60
 Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Val Leu Leu Asn Trp Ala
 65 70 75 80
 Asn Val Pro Tyr Pro Leu Cys Val Leu Trp Tyr Leu Thr His Glu Trp
 85 90 95
 Cys Trp Asn Ser Tyr Pro Pro Asn Ala Thr Ala Ser Thr Leu Leu His
 100 105 110
 Ala Cys Asn Thr Tyr Cys Tyr Trp Leu Tyr Ser Glu Asp Pro Gln Thr
 115 120 125
 Arg Lys Val Val Ile Thr Lys Gln His Thr Arg Lys Leu
 130 135 140

<210> 46
 <211> 118
 <212> PRT
 <213> Kluyveromyces lactis

<400> 46

```

Ala Asn Leu Leu His Pro Phe Thr Asp Ala Val Phe Ser Ala Met Arg
 1          5          10          15
Val Asn Ala Glu Gln Ile Ala Tyr Ile Leu Leu Val Thr Asn Tyr Ile
          20          25          30
Gly Val Leu Phe Ala Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr
          35          40          45
His Trp Thr Leu Pro Val Leu Leu Asn Trp Ala Asn Val Pro Tyr Pro
          50          55          60
Leu Cys Val Leu Trp Tyr Leu Thr His Glu Trp Cys Trp Asn Ser Tyr
65          70          75          80
Pro Pro Asn Ala Thr Ala Ser Thr Leu Leu His Ala Cys Asn Thr Tyr
          85          90          95
Cys Tyr Trp Leu Tyr Ser Glu Asp Pro Gln Thr Arg Lys Val Val Ile
          100          105          110
Thr Lys Gln His Thr Arg
          115

```

```

<210> 47
<211> 117
<212> PRT
<213> Saccharomyces cerevisiae

```

```

<400> 47
Ser Ser Leu Cys His Pro Leu Arg Lys Asn Ala Val Leu Asn Ala Asn
 1          5          10          15
Pro Ala Lys Thr Ile Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly
          20          25          30
Val Leu Phe Ser Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His
          35          40          45
Trp Thr Leu Pro Ile Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val
          50          55          60
Gly Pro Ile Trp Tyr Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro
65          70          75          80
Pro Asn Ser Gln Ala Ser Thr Leu Leu Leu Ala Leu Asn Thr Val Leu
          85          90          95
Leu Leu Leu Leu Ala Leu Thr Gln Leu Ser Gly Ser Val Ala Leu Ala
          100          105          110
Lys Ser His Leu Arg
          115

```

```

<210> 48
<211> 113
<212> PRT
<213> Kluyveromyces lactis

```

```

<400> 48
Phe Thr Asp Ala Val Phe Ser Ala Met Arg Val Asn Ala Glu Gln Ile
 1          5          10          15
Ala Tyr Ile Leu Leu Val Thr Asn Tyr Ile Gly Val Leu Phe Ala Arg
          20          25          30
Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Val
          35          40          45
Leu Leu Asn Trp Ala Asn Val Pro Tyr Pro Leu Cys Val Leu Trp Tyr
          50          55          60
Leu Thr His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ala Thr Ala
65          70          75          80

```

Ser Thr Leu Leu His Ala Cys Asn Thr Tyr Cys Tyr Trp Leu Tyr Ser
 85 90 95
 Glu Asp Pro Gln Thr Arg Lys Val Val Ile Thr Lys Gln His Thr Arg
 100 105 110

Lys

<210> 49
 <211> 106
 <212> PRT
 <213> Arabidopsis thaliana

<400> 49
 Phe Ser Asp Val Ser Ala Ser Arg Ile Ile Thr Lys Glu His Val Val
 1 5 10 15
 Thr Ala Met Phe Val Gly Asn Phe Ile Gly Ile Val Phe Ala Arg Ser
 20 25 30
 Leu His Tyr Gln Phe Tyr Ser Trp Tyr Phe Tyr Ser Leu Pro Tyr Leu
 35 40 45
 Leu Trp Arg Thr Pro Phe Pro Thr Trp Leu Arg Leu Ile Met Phe Leu
 50 55 60
 Gly Ile Glu Leu Cys Trp Asn Val Tyr Pro Ser Thr Pro Ser Ser Ser
 65 70 75 80
 Gly Leu Leu Leu Cys Leu His Leu Ile Ile Leu Val Gly Leu Trp Leu
 85 90 95
 Ala Pro Ser Val Asp Pro Tyr Gln Leu Lys
 100 105

<210> 50
 <211> 1668
 <212> DNA
 <213> Saccharomyces cerevisiae

<400> 50
 atgaattgca aggcggtaac cattagttta ttactgttgt tatttttaac aagagtatat 60
 attcagccga cattctcgtt aatttcagat tgcgatgaaa cttttaatta ttgggaacca 120
 ttaaatttat tggtagctgg atttggtaaa caaacctggg aatattcacc cgagtattct 180
 attagatcat gggctttctt attacctttt tactgtattc tttatccagt aaacaaattt 240
 actgacctag aaagtcattg gaactttttc atcacaagag catgcttagg ctttttttagt 300
 tttatcatgg aatttaaact acatcgtgaa attgcaggca gcttggcatt gcaaactcgca 360
 aatatttgga ttattttcca attgtttaat ccgggctggg tccatgcac tgtggaatta 420
 ttgccttctg ccgttgccat gttgttgtat gtaggtgcca ccagacactc tctacgctat 480
 ctgtccactg ggtctacttc taacttttacg aaaagttagg cgtacaattt cctgggtagt 540
 atactaggct ggccatttgt ttttaatttta agcttgccat tatgtttaca ttaccttttc 600
 aaccatagaa ttatttctac catcagaacc gcattcgact gctgtttgat attttcattg 660
 actgcatttg ctgtgattgt cactgacagt atattttacg ggaagcttgc tcctgtatca 720
 tggaacatct tattttacaa tgtcattaat gcaagtgagg aatctggccc aaatattttc 780
 ggggttgagc catggtacta ctatccacta aatttggttac tgaatttccc actgcctgtg 840
 ctagttttag ctattttggg aattttccat ttgagattat ggccattatg ggcatcatta 900
 ttacatgga ttgccgtttt cactcaacaa cctcacaaag aggaaagatt tctctatcca 960
 atttacgggt taataacttt gagtgcgaagt atcgccctttt acaaagtgtt gaatctattc 1020
 aatagaaagc cgattcttaa aaaaggtata aagttgtcag ttttattaat tgttgaggc 1080
 caggcaatgt cacggatagt ggctttgggtg aacaattaca cagctcctat agccgtctac 1140
 gagcaatttt cttcactaaa tcaaggtggg gtgaaggcac cggtagttaa tgtatgtacg 1200
 ggacgtgaat ggtatcactt cccaagttct ttctgtctgc cagataatca taggctaaaa 1260
 tttgttaaat ctggatttga tggctcttctt ccagggtgatt ttccagagag tggttctatt 1320

```

ttcaaaaaga ttagaacttt acctaaggga atgaataaca agaatatata tgataaccggt 1380
aaagagtggc cgatcactag atgtgattat tttattgaca tcgtcgcccc aataaattta 1440
acaaaagacg ttttcaaccc tctacatctg atggataact ggaataagct ggcatgtgct 1500
gcattcatcg acggtgaaaa ttctaagatt ttgggtagag cattttacgt accggagcca 1560
atcaaccgaa tcatgcaaat agttttacca aaacaatgga atcaagtgtg cggtgttcgt 1620
tacattgatt actgtttgtt tgaaaaacca actgagacta ctaattga 1668

```

<210> 51

<211> 555

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 51

```

Met Asn Cys Lys Ala Val Thr Ile Ser Leu Leu Leu Leu Phe Leu
 1          5          10          15
Thr Arg Val Tyr Ile Gln Pro Thr Phe Ser Leu Ile Ser Asp Cys Asp
 20          25          30
Glu Thr Phe Asn Tyr Trp Glu Pro Leu Asn Leu Leu Val Arg Gly Phe
 35          40          45
Gly Lys Gln Thr Trp Glu Tyr Ser Pro Glu Tyr Ser Ile Arg Ser Trp
 50          55          60
Ala Phe Leu Leu Pro Phe Tyr Cys Ile Leu Tyr Pro Val Asn Lys Phe
 65          70          75          80
Thr Asp Leu Glu Ser His Trp Asn Phe Phe Ile Thr Arg Ala Cys Leu
 85          90          95
Gly Phe Phe Ser Phe Ile Met Glu Phe Lys Leu His Arg Glu Ile Ala
100          105          110
Gly Ser Leu Ala Leu Gln Ile Ala Asn Ile Trp Ile Ile Phe Gln Leu
115          120          125
Phe Asn Pro Gly Trp Phe His Ala Ser Val Glu Leu Leu Pro Ser Ala
130          135          140
Val Ala Met Leu Leu Tyr Val Gly Ala Thr Arg His Ser Leu Arg Tyr
145          150          155          160
Leu Ser Thr Gly Ser Thr Ser Asn Phe Thr Lys Ser Leu Ala Tyr Asn
165          170          175
Phe Leu Ala Ser Ile Leu Gly Trp Pro Phe Val Leu Ile Leu Ser Leu
180          185          190
Pro Leu Cys Leu His Tyr Leu Phe Asn His Arg Ile Ile Ser Thr Ile
195          200          205
Arg Thr Ala Phe Asp Cys Cys Leu Ile Phe Ser Leu Thr Ala Phe Ala
210          215          220
Val Ile Val Thr Asp Ser Ile Phe Tyr Gly Lys Leu Ala Pro Val Ser
225          230          235          240
Trp Asn Ile Leu Phe Tyr Asn Val Ile Asn Ala Ser Glu Glu Ser Gly
245          250          255
Pro Asn Ile Phe Gly Val Glu Pro Trp Tyr Tyr Tyr Pro Leu Asn Leu
260          265          270
Leu Leu Asn Phe Pro Leu Pro Val Leu Val Leu Ala Ile Leu Gly Ile
275          280          285
Phe His Leu Arg Leu Trp Pro Leu Trp Ala Ser Leu Phe Thr Trp Ile
290          295          300
Ala Val Phe Thr Gln Gln Pro His Lys Glu Glu Arg Phe Leu Tyr Pro
305          310          315          320
Ile Tyr Gly Leu Ile Thr Leu Ser Ala Ser Ile Ala Phe Tyr Lys Val
325          330          335
Leu Asn Leu Phe Asn Arg Lys Pro Ile Leu Lys Lys Gly Ile Lys Leu
340          345          350
Ser Val Leu Leu Ile Val Ala Gly Gln Ala Met Ser Arg Ile Val Ala

```

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | 355 | | | | | 360 | | | | | 365 | | | | |
| Leu | Val | Asn | Asn | Tyr | Thr | Ala | Pro | Ile | Ala | Val | Tyr | Glu | Gln | Phe | Ser | |
| | 370 | | | | | 375 | | | | | 380 | | | | | |
| Ser | Leu | Asn | Gln | Gly | Gly | Val | Lys | Ala | Pro | Val | Val | Asn | Val | Cys | Thr | |
| 385 | | | | 390 | | | | | | 395 | | | | 400 | | |
| Gly | Arg | Glu | Trp | Tyr | His | Phe | Pro | Ser | Ser | Phe | Leu | Leu | Pro | Asp | Asn | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| His | Arg | Leu | Lys | Phe | Val | Lys | Ser | Gly | Phe | Asp | Gly | Leu | Leu | Pro | Gly | |
| | | | 420 | | | | | 425 | | | | | 430 | | | |
| Asp | Phe | Pro | Glu | Ser | Gly | Ser | Ile | Phe | Lys | Lys | Ile | Arg | Thr | Leu | Pro | |
| | | 435 | | | | 440 | | | | | | 445 | | | | |
| Lys | Gly | Met | Asn | Asn | Lys | Asn | Ile | Tyr | Asp | Thr | Gly | Lys | Glu | Trp | Pro | |
| | 450 | | | | | 455 | | | | | 460 | | | | | |
| Ile | Thr | Arg | Cys | Asp | Tyr | Phe | Ile | Asp | Ile | Val | Ala | Pro | Ile | Asn | Leu | |
| 465 | | | | 470 | | | | | | 475 | | | | | 480 | |
| Thr | Lys | Asp | Val | Phe | Asn | Pro | Leu | His | Leu | Met | Asp | Asn | Trp | Asn | Lys | |
| | | | | 485 | | | | | 490 | | | | | 495 | | |
| Leu | Ala | Cys | Ala | Ala | Phe | Ile | Asp | Gly | Glu | Asn | Ser | Lys | Ile | Leu | Gly | |
| | | | 500 | | | | | 505 | | | | | 510 | | | |
| Arg | Ala | Phe | Tyr | Val | Pro | Glu | Pro | Ile | Asn | Arg | Ile | Met | Gln | Ile | Val | |
| | 515 | | | | | 520 | | | | | | 525 | | | | |
| Leu | Pro | Lys | Gln | Trp | Asn | Gln | Val | Tyr | Gly | Val | Arg | Tyr | Ile | Asp | Tyr | |
| | 530 | | | | 535 | | | | | | 540 | | | | | |
| Cys | Leu | Phe | Glu | Lys | Pro | Thr | Glu | Thr | Thr | Asn | | | | | | |
| 545 | | | | 550 | | | | | | 555 | | | | | | |

```
<210> 52
<211> 600
<212> DNA
<213> Pichia pastoris
```

| <400> 52 | | | | | | |
|------------|------------|-------------|------------|------------|-------------|-----|
| tggccttcct | gtctgctcga | tacttccctt | tacagtaacc | aacatacatg | ttctccaaca | 60 |
| tgctcttgta | tgtattggcc | tattctatct | tgagacttga | tatcaacctt | ctatgggtatt | 120 |
| atttcagact | gtgatgaagt | gttcaactac | tgggagccac | tcaacttcat | gcttagaggg | 180 |
| tttgaaaaac | agacttgga | gtattctcca | gagtatgcc | tccgatcttg | gtcctatcta | 240 |
| gtgccacttt | ggatagcagg | ctatccacca | ttgttcctgg | atatcccttc | ttactacttt | 300 |
| ttctactttt | tcagactact | gctgggttatt | ttttcattgg | ttgcagaagt | caagttgtac | 360 |
| catagtttga | agaaaaatgt | cagcagtaag | atcagtttct | ggtaaccttt | atttacaacc | 420 |
| gttgctccag | gaatgcttca | tagcacgata | gccttattac | catcctcttt | tgctatggtt | 480 |
| tgtcacactt | ttgccattag | atacgtcatt | gattacctac | aattaccaac | attaatgcgc | 540 |
| acaatcagag | agactgctgc | catctcacca | gctcacaaac | aacaactaqc | caactctctc | 600 |

```
<210> 53
<211> 199
<212> PRT
<213> Pichia pastoris
```

| | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 53 | | | | | | | | | | | | | | | |
| Trp | Pro | Ser | Cys | Leu | Leu | Asp | Thr | Ser | Phe | Tyr | Ser | Asn | Gln | His | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Cys | Ser | Pro | Thr | Cys | Ser | Cys | Met | Tyr | Trp | Pro | Ile | Leu | Ser | Asp | Leu |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ile | Ser | Thr | Phe | Tyr | Gly | Ile | Ile | Ser | Asp | Cys | Asp | Glu | Val | Phe | Asn |
| | | 35 | | | | 40 | | | | | | 45 | | | |
| Tyr | Trp | Glu | Pro | Leu | Asn | Phe | Met | Leu | Arg | Gly | Phe | Gly | Lys | Gln | Thr |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 50 | | 55 | | 60 | | | | | | | | | | | |
| Trp | Glu | Tyr | Ser | Pro | Glu | Tyr | Ala | Ile | Arg | Ser | Trp | Ser | Tyr | Leu | Val |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Pro | Leu | Trp | Ile | Ala | Gly | Tyr | Pro | Pro | Leu | Phe | Leu | Asp | Ile | Pro | Ser |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Tyr | Tyr | Phe | Phe | Tyr | Phe | Phe | Arg | Leu | Leu | Leu | Val | Ile | Phe | Ser | Leu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Val | Ala | Glu | Val | Lys | Leu | Tyr | His | Ser | Leu | Lys | Lys | Asn | Val | Ser | Ser |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Lys | Ile | Ser | Phe | Trp | Tyr | Leu | Leu | Phe | Thr | Thr | Val | Ala | Pro | Gly | Met |
| 130 | | | | | | 135 | | | | | 140 | | | | |
| Ser | His | Ser | Thr | Ile | Ala | Leu | Leu | Pro | Ser | Ser | Phe | Ala | Met | Val | Cys |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| His | Thr | Phe | Ala | Ile | Arg | Tyr | Val | Ile | Asp | Tyr | Leu | Gln | Leu | Pro | Thr |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Met | Arg | Thr | Ile | Arg | Glu | Thr | Ala | Ala | Ile | Ser | Pro | Ala | His | Lys |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gln | Gln | Leu | Ala | Asn | Ser | Leu | | | | | | | | | |
| | | | 195 | | | | | | | | | | | | |

<210> 54

<211> 140

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (65)...(71)

<223> Xaa is a variable amino acid

<400> 54

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Ser | Thr | Phe | Tyr | Gly | Ile | Ile | Ser | Asp | Cys | Asp | Glu | Val | Phe | Asn |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Tyr | Trp | Glu | Pro | Leu | Asn | Phe | Met | Leu | Arg | Gly | Phe | Gly | Lys | Gln | Thr |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Trp | Glu | Tyr | Ser | Pro | Glu | Tyr | Ala | Ile | Arg | Ser | Trp | Ser | Tyr | Leu | Val |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Pro | Leu | Trp | Ile | Ala | Gly | Tyr | Pro | Pro | Leu | Phe | Leu | Asp | Ile | Pro | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Arg | Leu | Leu | Leu | Val | Ile | Phe | Ser | Leu |
| 65 | | | | 70 | | | | | 75 | | | | | | 80 |
| Val | Ala | Glu | Val | Lys | Leu | Tyr | His | Ser | Leu | Lys | Lys | Asn | Val | Ser | Ser |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Lys | Ile | Ser | Phe | Trp | Tyr | Leu | Leu | Phe | Thr | Thr | Val | Ala | Pro | Gly | Met |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ser | His | Ser | Thr | Ile | Ala | Leu | Leu | Pro | Ser | Ser | Phe | Ala | Met | Val | Cys |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| His | Thr | Phe | Ala | Ile | Arg | Tyr | Val | Ile | Asp | Tyr | Leu | | | | |
| | 130 | | | | | | 135 | | | | 140 | | | | |

<210> 55

<211> 141

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 55

```

Ile Gln Pro Thr Phe Ser Leu Ile Ser Asp Cys Asp Glu Thr Phe Asn
 1          5          10          15
Tyr Trp Glu Pro Leu Asn Leu Leu Val Arg Gly Phe Gly Lys Gln Thr
          20          25          30
Trp Glu Tyr Ser Pro Glu Tyr Ser Ile Arg Ser Trp Ala Phe Leu Leu
          35          40          45
Pro Phe Tyr Cys Ile Leu Tyr Pro Val Asn Lys Phe Thr Asp Leu Glu
          50          55          60
Ser His Trp Asn Phe Phe Ile Thr Arg Ala Cys Leu Gly Phe Phe Ser
65          70          75          80
Phe Ile Met Glu Phe Lys Leu His Arg Glu Ile Ala Gly Ser Leu Ala
          85          90          95
Leu Gln Ile Ala Asn Ile Trp Ile Ile Phe Gln Leu Phe Asn Pro Gly
          100          105          110
Trp Phe His Ala Ser Val Glu Leu Leu Pro Ser Ala Val Ala Met Leu
          115          120          125
Leu Tyr Val Gly Ala Thr Arg His Ser Leu Arg Tyr Leu
          130          135          140

```

<210> 56
 <211> 127
 <212> PRT
 <213> *Pichia pastoris*

<220>
 <221> MOD_RES
 <222> (66)...(72)
 <223> Xaa is a variable amino acid

```

<400> 56
Leu Ile Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe
 1          5          10          15
Asn Tyr Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln
          20          25          30
Thr Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu
          35          40          45
Val Pro Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro
          50          55          60
Ser Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser
65          70          75          80
Leu Val Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser
          85          90          95
Ser Lys Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly
          100          105          110
Met Ser His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met
          115          120          125

```

<210> 57
 <211> 127
 <212> PRT
 <213> *Anopheles gambiae*

```

<400> 57
Leu Gln Ser Ala Leu Tyr Ser Ile Ile Ser Asp Cys Asp Glu Thr Tyr
 1          5          10          15
Asn Tyr Trp Glu Pro Leu His Tyr Leu Leu Lys Gly Lys Gly Phe Gln

```

```

      20      25      30
Thr Trp Glu Tyr Ser Pro Glu Phe Ala Leu Arg Ser Tyr Ser Tyr Leu
      35      40      45
Trp Leu His Gly Leu Pro Ala Lys Val Leu Gln Leu Met Thr Asp Asn
      50      55      60
Gly Val Leu Ile Phe Tyr Phe Val Arg Cys Leu Leu Ala Val Thr Cys
      65      70      75      80
Ala Leu Leu Glu Tyr Arg Leu Tyr Arg Ile Leu Gly Arg Lys Cys Gly
      85      90      95
Gly Gly Val Ala Ser Leu Trp Leu Leu Phe Gln Leu Thr Ser Ala Gly
      100      105      110
Met Phe Ile Ser Ser Ala Ala Leu Leu Pro Ser Ser Phe Ser Met
      115      120      125

```

<210> 58

<211> 157

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (66)...(72)

<223> Xaa is a variable amino acid

<400> 58

```

Leu Ile Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe
 1      5      10      15
Asn Tyr Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln
      20      25      30
Thr Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu
      35      40      45
Val Pro Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro
      50      55      60
Ser Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser
      65      70      75      80
Leu Val Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser
      85      90      95
Ser Lys Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly
      100      105      110
Met Ser His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met Val
      115      120      125
Cys His Thr Phe Ala Ile Arg Tyr Val Ile Asp Tyr Leu Gln Leu Pro
      130      135      140
Thr Leu Met Arg Thr Ile Arg Glu Thr Ala Ala Ile Ser
      145      150      155

```

<210> 59

<211> 154

<212> PRT

<213> *Schizosaccharomyces pombe*

<400> 59

```

Leu Thr Ser Ala Ser Phe Arg Val Ile Asp Asp Cys Asp Glu Val Tyr
 1      5      10      15
Asn Tyr Trp Glu Pro Leu His Tyr Leu Leu Tyr Gly Tyr Gly Leu Gln
      20      25      30

```



```

Thr Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Phe Tyr Ile
  35          40          45
Ala Leu His Ala Val Pro Gly Phe Leu Ala Arg Gly Leu Gly Leu Ser
  50          55          60
Arg Leu His Val Phe Tyr Phe Ile Arg Gly Val Leu Ala Cys Phe Ser
  65          70          75          80
Ala Phe Cys Glu Thr Asn Leu Ile Leu Ala Val Ala Arg Asn Phe Asn
          85          90          95
Arg Ala Val Ala Leu His Leu Thr Ser Val Leu Phe Val Asn Ser Gly
          100          105          110
Met Trp Ser Ala Ser Thr Ser Phe Leu Pro Ser Ser Phe Ala Met Asn
  115          120          125
Met Val Thr Leu Ala Leu Ser Ala Gln Leu Ser Pro Pro Ser Thr Lys
  130          135          140
Arg Thr Val Lys Val Val Ser Phe Ile Thr
  145          150

```

```

<210> 60
<211> 141
<212> PRT
<213> Pichia pastoris

```

```

<220>
<221> MOD_RES
<222> (80)...(86)
<223> Xaa is a variable amino acid

```

```

<400> 60
Ser Pro Thr Cys Ser Cys Met Tyr Trp Pro Ile Leu Ser Asp Leu Ile
  1          5          10          15
Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe Asn Tyr
          20          25          30
Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln Thr Trp
  35          40          45
Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu Val Pro
  50          55          60
Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro Ser Xaa
  65          70          75          80
Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser Leu Val
          85          90          95
Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser Ser Lys
          100          105          110
Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly Met Ser
          115          120          125
His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met
          130          135          140

```

```

<210> 61
<211> 143
<212> PRT
<213> Mus musculus

```

```

<400> 61
Ala Pro Glu Gly Ser Thr Ala Phe Lys Cys Leu Leu Ser Ala Arg Leu
  1          5          10          15
Cys Ala Ala Leu Leu Ser Asn Ile Ser Asp Cys Asp Glu Thr Phe Asn

```

```

      20      25      30
Tyr Trp Glu Pro Thr His Tyr Leu Ile Tyr Gly Lys Gly Phe Gln Thr
      35      40      45
Trp Glu Tyr Ser Pro Val Tyr Ala Ile Arg Ser Tyr Ala Tyr Leu Leu
      50      55      60
Leu His Ala Trp Pro Ala Ala Phe His Ala Arg Ile Leu Gln Thr Asn
      65      70      75      80
Lys Ile Leu Val Phe Tyr Phe Leu Arg Cys Leu Leu Ala Phe Val Ser
      85      90      95
Cys Val Cys Glu Leu Tyr Phe Tyr Lys Ala Val Cys Lys Lys Phe Gly
      100      105      110
Leu His Val Ser Arg Met Met Leu Ala Phe Leu Val Leu Ser Thr Gly
      115      120      125
Met Phe Cys Ser Ser Ser Ala Phe Leu Pro Ser Ser Phe Cys Met
      130      135      140

```

<210> 62
 <211> 141
 <212> PRT
 <213> *Pichia pastoris*

<220>
 <221> MOD_RES
 <222> (80)...(86)
 <223> Xaa is a variable amino acid

```

<400> 62
Ser Pro Thr Cys Ser Cys Met Tyr Trp Pro Ile Leu Ser Asp Leu Ile
  1      5      10      15
Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe Asn Tyr
      20      25      30
Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln Thr Trp
      35      40      45
Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu Val Pro
      50      55      60
Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro Ser Xaa
      65      70      75      80
Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser Leu Val
      85      90      95
Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser Ser Lys
      100      105      110
Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly Met Ser
      115      120      125
His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met
      130      135      140

```

<210> 63
 <211> 143
 <212> PRT
 <213> *Homo sapiens*

```

<400> 63
Ala Pro Glu Gly Ser Thr Ala Phe Lys Cys Leu Leu Ser Ala Arg Leu
  1      5      10      15
Cys Ala Ala Leu Leu Ser Asn Ile Ser Asp Cys Asp Glu Thr Phe Asn
      20      25      30

```

```

Tyr Trp Glu Pro Thr His Tyr Leu Ile Tyr Gly Glu Gly Phe Gln Thr
      35              40              45
Trp Glu Tyr Ser Pro Ala Tyr Ala Ile Arg Ser Tyr Ala Tyr Leu Leu
      50              55              60
Leu His Ala Trp Pro Ala Phe His Ala Arg Ile Leu Gln Thr Asn
      65              70              75              80
Lys Ile Leu Val Phe Tyr Phe Leu Arg Cys Leu Leu Ala Phe Val Ser
              85              90              95
Cys Ile Cys Glu Leu Tyr Phe Tyr Lys Ala Val Cys Lys Lys Phe Gly
              100              105              110
Leu His Val Ser Arg Met Met Leu Ala Phe Leu Val Leu Ser Thr Gly
              115              120              125
Met Phe Cys Ser Ser Ser Ala Phe Leu Pro Ser Ser Phe Cys Met
      130              135              140

```

<210> 64

<211> 1656

<212> DNA

<213> *Saccharomyces cerevisiae*

<400> 64

```

atgcggttgggt ctgtccttga tacagtgccta ttgaccgtga tttccttttca tctaataccaa 60
gtccattca ccaaggtgga agagagtttt aatattcaag ccattcatga tattttaacc 120
tacagcgatat ttgatattctc ccaatatgac cacttgaaat ttcctggagt agtccctaga 180
acattcggttg gtgctgtgat tattgcaatg ctttcgagac cttatcttta cttgagttct 240
ttgatccaaa cttccaggcc tacgtctata gatgttcaat tggctcgtag ggggattggt 300
ggcctcacca atgggctttc ttttatctat ttaaagaatt gtttgcaaga tatgtttgat 360
gaaatcactg aaaagaaaaa ggaagaaaat gaagacaagg atatatacat ttacgatagc 420
gctggtacat ggtttctttt atttttaatt ggcagtttcc acctcatggt ctacagcact 480
aggactctgc ctaattttgt catgactctg cctctaacca acgtcgcatt ggggtgggtt 540
ttattgggtc gttataatgc agctatattc ctatctgcgc tcgtggcaat tgtatttaga 600
ctggaagtgt cagctctcag tgctggtatt gctctattta gcgtcatctt caagaagatt 660
tctttattcg atgctatcaa attcggtatc tttggcttgg gacttgggtc cgccatcagt 720
atcaccgttg attcatattt ctggcaagaa tgggtgtctac ctgaggtaga tgggtttcttg 780
ttcaacgtgg ttgcggtgta cgcttccaag tggggtgtgg agccagttac tgcttatttc 840
acgcattact tgagaatgat gtttatgcca ccaactgttt tactattgaa ttacttcggc 900
tataaattag cacctgcaaa attaaaaatt gtctcactag catctctttt ccacattatc 960
gtcttatcct ttcaacctca caaagaatgg agattcatca tctacgctgt tccatctatc 1020
atgttgctag gtgccacagg agcagcacat ctatgggaga atatgaaagt aaaaaagatt 1080
accaatgttt tatgtttggc tatattgccc ttatctataa tgacctcctt tttcattttca 1140
atggcgttct tgtatatatc aagaatgaat tatccaggcg gcgaggcttt aacttctttt 1200
aatgacatga ttgtggaaaa aatatattaca aacgctacag ttcatatcag catacctoct 1260
tgcatgacag gtgtcacttt atttggtgaa ttgaactacg gtgtgtacgg catcaattac 1320
gataagactg aaaatacgac tttactgcag gaaatgtggc cctcctttga tttcttgatc 1380
accacgagc caaccgcctc tcaattgcca ttcgagaata agactaccaa ccattgggag 1440
ctagttaaca caacaaagat gtttactgga tttgacccaa cctacattaa gaactttggt 1500
ttccaagaga gagtgaatgt tttgtctcta ctcaaacaga tcattttcga caagaccct 1560
accgtttttt tgaaagaatt gacggccaat tcgattgtta aaagcgatgt cttcttcacc 1620
tataagagaa tcaaacaaga tgaaaaaact gattga 1656

```

<210> 65

<211> 551

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 65

Met Arg Trp Ser Val Leu Asp Thr Val Leu Leu Thr Val Ile Ser Phe

| | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|
| 1 | | 5 | | 10 | | 15 |
| His | Leu | Ile | Gln | Ala | Pro | Phe |
| | | | 20 | | | |
| Gln | Ala | Ile | His | Asp | Ile | Leu |
| | | 35 | | | | |
| Tyr | Asp | His | Leu | Lys | Phe | Pro |
| | | | | | | |
| Ala | Val | Ile | Ile | Ala | Met | Leu |
| 65 | | | | | 70 | |
| Leu | Ile | Gln | Thr | Ser | Arg | Pro |
| | | | | | | |
| Arg | Gly | Ile | Val | Gly | Leu | Thr |
| | | | | | | |
| Asn | Cys | Leu | Gln | Asp | Met | Phe |
| | | | | | | |
| Glu | Asn | Glu | Asp | Lys | Asp | Ile |
| | | | | | | |
| Phe | Leu | Leu | Phe | Leu | Ile | Gly |
| 145 | | | | | | |
| Arg | Thr | Leu | Pro | Asn | Phe | Val |
| | | | | | | |
| Leu | Gly | Trp | Val | Leu | Leu | Gly |
| | | | | | | |
| Ala | Leu | Val | Ala | Ile | Val | Phe |
| | | | | | | |
| Gly | Ile | Ala | Leu | Phe | Ser | Val |
| | | | | | | |
| Ala | Ile | Lys | Phe | Gly | Ile | Phe |
| 225 | | | | | | |
| Ile | Thr | Val | Asp | Ser | Tyr | Phe |
| | | | | | | |
| Asp | Gly | Phe | Leu | Phe | Asn | Val |
| | | | | | | |
| Val | Glu | Pro | Val | Thr | Ala | Tyr |
| | | | | | | |
| Met | Pro | Pro | Thr | Val | Leu | Leu |
| | | | | | | |
| Pro | Ala | Lys | Leu | Lys | Ile | Val |
| 305 | | | | | | |
| Val | Leu | Ser | Phe | Gln | Pro | His |
| | | | | | | |
| Val | Pro | Ser | Ile | Met | Leu | Leu |
| | | | | | | |
| Glu | Asn | Met | Lys | Val | Lys | Lys |
| | | | | | | |
| Leu | Pro | Leu | Ser | Ile | Met | Thr |
| | | | | | | |
| Tyr | Ile | Ser | Arg | Met | Asn | Tyr |
| 385 | | | | | | |
| Asn | Asp | Met | Ile | Val | Glu | Lys |
| | | | | | | |
| Ser | Ile | Pro | Pro | Cys | Met | Thr |
| | | | | | | |
| Tyr | Gly | Val | Tyr | Gly | Ile | Asn |
| | | | | | | |
| Leu | Gln | Glu | Met | Trp | Pro | Ser |
| | | | | | | |
| Thr | Ala | Ser | Gln | Leu | Pro | Phe |
| | | | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Leu | Val | Asn | Thr | Thr | Lys | Met | Phe | Thr | Gly | Phe | Asp | Pro | Thr | Tyr | Ile |
| | | | | 485 | | | | | 490 | | | | | 495 | |
| Lys | Asn | Phe | Val | Phe | Gln | Glu | Arg | Val | Asn | Val | Leu | Ser | Leu | Leu | Lys |
| | | | 500 | | | | | 505 | | | | | 510 | | |
| Gln | Ile | Ile | Phe | Asp | Lys | Thr | Pro | Thr | Val | Phe | Leu | Lys | Glu | Leu | Thr |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Ala | Asn | Ser | Ile | Val | Lys | Ser | Asp | Val | Phe | Phe | Thr | Tyr | Lys | Arg | Ile |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Lys | Gln | Asp | Glu | Lys | Thr | Asp | | | | | | | | | |
| 545 | | | | | 550 | | | | | | | | | | |

<210> 66
 <211> 840
 <212> DNA
 <213> *Pichia pastoris*

<400> 66
 tcgggtcgaga atgataactg aagaactcaa aatctctcac actttcatcg ttactgtact 60
 ggcaatcatt gcatttcagc ctcataaaga atggagattt atagttttaca ttgttccacc 120
 acttgatcat accatatcta cagtacttgc acaactaccc aggagattca caatcgtcaa 180
 agttgctggt tttctcctaa gtttcggctc tttgctcata tccctgtcgt ttcttttcat 240
 ctcatcgat aactaccctg ggggtgaagc ttacagcat ttgaacgaga aactccttct 300
 actggaccaa agttccctac ctggtgatata taagggttcat atggatgtcc ctgcatgcat 360
 gactggggtg actttatttg gttacttggg taactcaaaa ttgaacaatt taagaattgt 420
 ctatgataaa acagaagacg agtcgctgga cacaatctgg gattctttca attatgtcat 480
 ctccgaaatt gacttggatt cttcgactgc tcccaaattg gagggggatt ggctgaagat 540
 tgatgttggt caaggctaca acggcatcaa taaacaatct atcaaaaata caattttcaa 600
 ttatggaata cttaaaccgga tgataagaga cgcaaccaaaa cttgatgttg gatttattcg 660
 tacggtcttt cgatccttca taaaatttga tgataaatta ttcatttatg agaggagcag 720
 tcaaacctga aaatatatac ctcatttggt caatttggtg taaagagtgt ggcggataga 780
 cttcttgtaa atcaggaaaag ctacaattcc aattgctgca aaaaatacca atgcccataa 840

<210> 67
 <211> 239
 <212> PRT
 <213> *Pichia pastoris*

<400> 67
 Arg Met Ile Thr Glu Glu Leu Lys Ile Ser His Thr Phe Ile Val Thr
 1 5 10 15
 Val Leu Ala Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile
 20 25 30
 Val Tyr Ile Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala
 35 40 45
 Gln Leu Pro Arg Arg Phe Thr Ile Val Lys Val Ala Val Phe Leu Leu
 50 55 60
 Ser Phe Gly Ser Leu Leu Ile Ser Leu Ser Phe Leu Phe Ile Ser Ser
 65 70 75 80
 Tyr Asn Tyr Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu
 85 90 95
 Leu Leu Leu Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met
 100 105 110
 Asp Val Pro Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp
 115 120 125
 Asn Ser Lys Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp

```

      130              135              140
Glu Ser Leu Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
145              150              155              160
Ile Asp Leu Asp Ser Ser Thr Ala Pro Lys Trp Glu Gly Asp Trp Leu
      165              170              175
Lys Ile Asp Val Val Gln Gly Tyr Asn Gly Ile Asn Lys Gln Ser Ile
      180              185              190
Lys Asn Thr Ile Phe Asn Tyr Gly Ile Leu Lys Arg Met Ile Arg Asp
      195              200              205
Ala Thr Lys Leu Asp Val Gly Phe Ile Arg Thr Val Phe Arg Ser Phe
      210              215              220
Ile Lys Phe Asp Asp Lys Leu Phe Ile Tyr Glu Arg Ser Ser Gln
225              230              235

```

<210> 68

<211> 239

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (62)...(80)

<223> Xaa is a variable amino acid

<400> 68

```

Arg Met Ile Thr Glu Glu Leu Lys Ile Ser His Thr Phe Ile Val Thr
 1              5              10              15
Val Leu Ala Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile
      20              25              30
Val Tyr Ile Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala
      35              40              45
Gln Leu Pro Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa
50              55              60
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
65              70              75              80
Tyr Asn Tyr Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu
      85              90              95
Leu Leu Leu Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met
      100              105              110
Asp Val Pro Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp
      115              120              125
Asn Ser Lys Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp
      130              135              140
Glu Ser Leu Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
145              150              155              160
Ile Asp Leu Asp Ser Ser Thr Ala Pro Lys Trp Glu Gly Asp Trp Leu
      165              170              175
Lys Ile Asp Val Val Gln Gly Tyr Asn Gly Ile Asn Lys Gln Ser Ile
      180              185              190
Lys Asn Thr Ile Phe Asn Tyr Gly Ile Leu Lys Arg Met Ile Arg Asp
      195              200              205
Ala Thr Lys Leu Asp Val Gly Phe Ile Arg Thr Val Phe Arg Ser Phe
      210              215              220
Ile Lys Phe Asp Asp Lys Leu Phe Ile Tyr Glu Arg Ser Ser Gln
225              230              235

```

<210> 69
 <211> 245
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 69
 Lys Leu Ala Pro Ala Lys Leu Lys Ile Val Ser Leu Ala Ser Leu Phe
 1 5 10 15
 His Ile Ile Val Leu Ser Phe Gln Pro His Lys Glu Trp Arg Phe Ile
 20 25 30
 Ile Tyr Ala Val Pro Ser Ile Met Leu Leu Gly Ala Thr Gly Ala Ala
 35 40 45
 His Leu Trp Glu Asn Met Lys Val Lys Lys Ile Thr Asn Val Leu Cys
 50 55 60
 Leu Ala Ile Leu Pro Leu Ser Ile Met Thr Ser Phe Phe Ile Ser Met
 65 70 75 80
 Ala Phe Leu Tyr Ile Ser Arg Met Asn Tyr Pro Gly Gly Glu Ala Leu
 85 90 95
 Thr Ser Phe Asn Asp Met Ile Val Glu Lys Asn Ile Thr Asn Ala Thr
 100 105 110
 Val His Ile Ser Ile Pro Pro Cys Met Thr Gly Val Thr Leu Phe Gly
 115 120 125
 Glu Leu Asn Tyr Gly Val Tyr Gly Ile Asn Tyr Asp Lys Thr Glu Asn
 130 135 140
 Thr Thr Leu Leu Gln Glu Met Trp Pro Ser Phe Asp Phe Leu Ile Thr
 145 150 155 160
 His Glu Pro Thr Ala Ser Gln Leu Pro Phe Glu Asn Lys Thr Thr Asn
 165 170 175
 His Trp Glu Leu Val Asn Thr Thr Lys Met Phe Thr Gly Phe Asp Pro
 180 185 190
 Thr Tyr Ile Lys Asn Phe Val Phe Gln Glu Arg Val Asn Val Leu Ser
 195 200 205
 Leu Leu Lys Gln Ile Ile Phe Asp Lys Thr Pro Thr Val Phe Leu Lys
 210 215 220
 Glu Leu Thr Ala Asn Ser Ile Val Lys Ser Asp Val Phe Phe Thr Tyr
 225 230 235 240
 Lys Arg Ile Lys Gln
 245

<210> 70
 <211> 141
 <212> PRT
 <213> *Pichia pastoris*

<220>
 <221> MOD_RES
 <222> (43)...(61)
 <223> Xaa is a variable amino acid

<400> 70
 Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile Val Tyr Ile
 1 5 10 15
 Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala Gln Leu Pro
 20 25 30
 Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa Xaa Xaa Xaa
 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Asn Tyr

```

      50              55              60
Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu Leu Leu Leu
65      70      75      80
Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met Asp Val Pro
      85      90      95
Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp Asn Ser Lys
      100      105      110
Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp Glu Ser Leu
      115      120      125
Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
      130      135      140

```

```

<210> 71
<211> 137
<212> PRT
<213> Schizosaccharomyces pombe

```

```

<400> 71
Val Tyr Ser Phe Leu Gly His Lys Glu Trp Arg Phe Ile Ile Tyr Ser
1      5      10      15
Ile Pro Trp Phe Asn Ala Ala Ser Ala Ile Gly Ala Ser Leu Cys Phe
      20      25      30
Asn Ala Ser Lys Phe Gly Lys Lys Ile Phe Glu Ile Leu Arg Leu Met
      35      40      45
Phe Phe Ser Gly Ile Ile Phe Gly Phe Ile Gly Ser Ser Phe Leu Leu
      50      55      60
Tyr Val Phe Gln Tyr Ala Tyr Pro Gly Gly Leu Ala Leu Thr Arg Leu
65      70      75      80
Tyr Glu Ile Glu Asn His Pro Gln Val Ser Val His Met Asp Val Tyr
      85      90      95
Pro Cys Met Thr Gly Ile Thr Arg Phe Ser Gln Leu Pro Ser Trp Tyr
      100      105      110
Tyr Asp Lys Thr Glu Asp Pro Lys Met Leu Ser Asn Ser Leu Phe Ile
      115      120      125
Ser Gln Phe Asp Tyr Leu Ile Thr Glu
      130      135

```

```

<210> 72
<211> 143
<212> PRT
<213> Pichia pastoris

```

```

<220>
<221> MOD_RES
<222> (45)...(63)
<223> Xaa is a variable amino acid

```

```

<400> 72
Leu Ala Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile Val
1      5      10      15
Tyr Ile Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala Gln
      20      25      30
Leu Pro Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa Xaa
      35      40      45
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr
      50      55      60

```



```

Asn Tyr Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu Leu
65              70              75              80
Leu Leu Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met Asp
85              90
Val Pro Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp Asn
100            105            110
Ser Lys Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp Glu
115            120            125
Ser Leu Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
130            135            140

```

```

<210> 73
<211> 137
<212> PRT
<213> Homo sapiens

```

```

<400> 73
Met Ala Leu Tyr Ser Leu Leu Pro His Lys Glu Leu Arg Phe Ile Ile
1      5      10      15
Tyr Ala Phe Pro Met Leu Asn Ile Thr Ala Ala Arg Gly Cys Ser Tyr
20     25     30
Leu Leu Asn Asn Tyr Lys Lys Ser Trp Leu Tyr Lys Ala Gly Ser Leu
35     40     45
Leu Val Ile Gly His Leu Val Val Asn Ala Ala Tyr Ser Ala Thr Ala
50     55     60
Leu Tyr Val Ser His Phe Asn Tyr Pro Gly Gly Val Ala Met Gln Arg
65     70     75     80
Leu His Gln Leu Val Pro Pro Gln Thr Asp Val Leu Leu His Ile Asp
85     90     95
Val Ala Ala Ala Gln Thr Gly Val Ser Arg Phe Leu Gln Val Asn Ser
100    105    110
Ala Trp Arg Tyr Asp Lys Arg Glu Asp Val Gln Pro Gly Thr Gly Met
115    120    125
Leu Ala Tyr Thr His Ile Leu Met Glu
130    135

```

```

<210> 74
<211> 1635
<212> DNA
<213> Saccharomyces cerevisiae

```

```

<400> 74
atggccattg gcaaaagggtt actggtgaac aaaccagcag aagaatcatt ttatgcttct 60
ccaatgtatg attttttgta tccgtttagg ccagtgggga accaatggct gccagaatat 120
attatctttg tatgtgctgt aatactgagg tgcacaattg gacttgggtcc atattctggg 180
aaaggcagtc caccgctgta cggcgatttt gaggtcaga gacattggat ggaaattacg 240
caacatttac cgcttttctaa gtggtactgg tatgatttgc aatactgggg attggactat 300
ccaccattaa cagcatttca ttcgtacctt ctgggcctaa ttgatcttt tttcaatcca 360
tcttggtttg cactagaaaa gtcacgtggc ttgaatccc ccgataatgg cctgaaaaca 420
tatatgcgtt ctactgtcat cattagcgac atattgtttt actttcctgc agtaatatat 480
tttactaagt ggcttggtag atatcgaaac cagtcgcca taggacaatc tattgcggca 540
tcagcgattt tgttccaacc ttcattaatg ctcatgacc atgggcactt tcaatataat 600
tcagtcatgc ttggccttac tgcttatgcc ataaataact tattagatga gtattatgct 660
atggcggccg tttgttttgt cctatccatt tgttttaaac aaatggcatt gtattatgca 720
ccgatttttt ttgcttatct attaagtcga tcattgctgt tcccaaatt taacatagct 780
agattgacgg ttattgcgtt tgcaacactc gcaacttttg ctataatatt tgcgccatta 840

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```

tatttcttgg gaggaggatt aaagaatatt caccaatgta ttcacaggat attccctttt 900
gccaggggca tcttcgaaga caaggttgct aacttctggg gcgttacgaa cgtgttttga 960
aaatacaagg aaagattcac tatacaacaa ctccagctat attcattgat tgccaccgtg 1020
attggtttct taccagccat gataatgaca ttacttcatc ccaaaaagca tcttctccca 1080
tacgtgttaa tcgcatgttc gatgtccttt tttcttttta gctttcaagt acatgagaaa 1140
actatcctca tcccactttt gcctattaca ctactctact cctctactga ttggaatgtt 1200
ctatctcttg taagttggat aaacaatgtg gctttgttta cgctatggcc tttgttgaaa 1260
aaggacggtc ttcatttaca gtatgccgta tctttcttac taagcaattg gctgattgga 1320
aatttcagtt ttattacacc aaggttcttg ccaaaatctt taactcctgg cccttctatc 1380
agcagcatca atagcgacta tagaagaaga agcttactgc catataatgt ggtttgga 1440
agttttatca taggaacgta tattgctatg ggcttttatc atttcttaga tcaatttgta 1500
gcacctccat cgaaatatcc agacttggtg gtgttggtga actgtgctgt tgggttcatt 1560
tgcttttagca tattttggct atggtcttat tacaagatat tcacttccgg tagcaaatcc 1620
atgaaggact tgtag                                     1635

```

<210> 75

<211> 544

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 75

```

Met Ala Ile Gly Lys Arg Leu Leu Val Asn Lys Pro Ala Glu Glu Ser
 1          5          10          15
Phe Tyr Ala Ser Pro Met Tyr Asp Phe Leu Tyr Pro Phe Arg Pro Val
 20          25          30
Gly Asn Gln Trp Leu Pro Glu Tyr Ile Ile Phe Val Cys Ala Val Ile
 35          40          45
Leu Arg Cys Thr Ile Gly Leu Gly Pro Tyr Ser Gly Lys Gly Ser Pro
 50          55          60
Pro Leu Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile Thr
 65          70          75          80
Gln His Leu Pro Leu Ser Lys Trp Tyr Trp Tyr Asp Leu Gln Tyr Trp
 85          90          95
Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Leu Leu Gly
100          105          110
Leu Ile Gly Ser Phe Phe Asn Pro Ser Trp Phe Ala Leu Glu Lys Ser
115          120          125
Arg Gly Phe Glu Ser Pro Asp Asn Gly Leu Lys Thr Tyr Met Arg Ser
130          135          140
Thr Val Ile Ile Ser Asp Ile Leu Phe Tyr Phe Pro Ala Val Ile Tyr
145          150          155          160
Phe Thr Lys Trp Leu Gly Arg Tyr Arg Asn Gln Ser Pro Ile Gly Gln
165          170          175
Ser Ile Ala Ala Ser Ala Ile Leu Phe Gln Pro Ser Leu Met Leu Ile
180          185          190
Asp His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly Leu Thr Ala
195          200          205
Tyr Ala Ile Asn Asn Leu Leu Asp Glu Tyr Tyr Ala Met Ala Ala Val
210          215          220
Cys Phe Val Leu Ser Ile Cys Phe Lys Gln Met Ala Leu Tyr Tyr Ala
225          230          235          240
Pro Ile Phe Phe Ala Tyr Leu Leu Ser Arg Ser Leu Leu Phe Pro Lys
245          250          255
Phe Asn Ile Ala Arg Leu Thr Val Ile Ala Phe Ala Thr Leu Ala Thr
260          265          270
Phe Ala Ile Ile Phe Ala Pro Leu Tyr Phe Leu Gly Gly Gly Leu Lys
275          280          285
Asn Ile His Gln Cys Ile His Arg Ile Phe Pro Phe Ala Arg Gly Ile

```

| | | | | |
|---|---|---------------------|--|-----|
| 290 | | 295 | | 300 |
| Phe Glu Asp Lys Val | Ala Asn Phe Trp Cys Val | Thr Asn Val Phe Val | | |
| 305 | 310 | 315 | | 320 |
| Lys Tyr Lys Glu Arg | Phe Thr Ile Gln Gln Leu Gln Leu Tyr Ser Leu | | | |
| | 325 | 330 | | 335 |
| Ile Ala Thr Val Ile Gly Phe Leu Pro | Ala Met Ile Met Thr Leu Leu | | | |
| | 340 | 345 | | 350 |
| His Pro Lys Lys His Leu Leu Pro Tyr Val Leu Ile Ala Cys Ser Met | | | | |
| | 355 | 360 | | 365 |
| Ser Phe Phe Leu Phe Ser Phe Gln Val His Glu Lys Thr Ile Leu Ile | | | | |
| | 370 | 375 | | 380 |
| Pro Leu Leu Pro Ile Thr Leu Leu Tyr Ser Ser Thr Asp Trp Asn Val | | | | |
| | 385 | 390 | | 400 |
| Leu Ser Leu Val Ser Trp Ile Asn Asn Val Ala Leu Phe Thr Leu Trp | | | | |
| | 405 | 410 | | 415 |
| Pro Leu Leu Lys Lys Asp Gly Leu His Leu Gln Tyr Ala Val Ser Phe | | | | |
| | 420 | 425 | | 430 |
| Leu Leu Ser Asn Trp Leu Ile Gly Asn Phe Ser Phe Ile Thr Pro Arg | | | | |
| | 435 | 440 | | 445 |
| Phe Leu Pro Lys Ser Leu Thr Pro Gly Pro Ser Ile Ser Ser Ile Asn | | | | |
| | 450 | 455 | | 460 |
| Ser Asp Tyr Arg Arg Arg Ser Leu Leu Pro Tyr Asn Val Val Trp Lys | | | | |
| | 465 | 470 | | 480 |
| Ser Phe Ile Ile Gly Thr Tyr Ile Ala Met Gly Phe Tyr His Phe Leu | | | | |
| | 485 | 490 | | 495 |
| Asp Gln Phe Val Ala Pro Pro Ser Lys Tyr Pro Asp Leu Trp Val Leu | | | | |
| | 500 | 505 | | 510 |
| Leu Asn Cys Ala Val Gly Phe Ile Cys Phe Ser Ile Phe Trp Leu Trp | | | | |
| | 515 | 520 | | 525 |
| Ser Tyr Tyr Lys Ile Phe Thr Ser Gly Ser Lys Ser Met Lys Asp Leu | | | | |
| | 530 | 535 | | 540 |

<210> 76
 <211> 1644
 <212> DNA
 <213> *Pichia pastoris*

<400> 76

| | | | | | | |
|-------------|------------|-------------|-------------|------------|------------|------|
| atgccacata | aaagaacgcc | ctctagcagt | ctgctgtatg | caagaattcc | agggatctct | 60 |
| tttgaaaact | ctccggtggt | tgattttttg | tctccttttg | gacccgctcc | taatcaatgg | 120 |
| gtagcacgat | acatcatcat | catctttgca | attctcatca | gattggcagt | tgggctgggc | 180 |
| tctatttccg | gcttcaacac | ccctccaatg | tatggggatt | ttgaagctca | gaggcattgg | 240 |
| atggaaatta | ctcagcattt | atccatagaa | aaatgggtact | tctacgactt | gcaatattgg | 300 |
| gggcttgact | atcctccctt | gacagccttt | cattcatact | tctttggcaa | attaggcagc | 360 |
| ttcatcaatc | cagcatgggt | tgcttttagac | gtctccagag | ggtttgaatc | agtggatcta | 420 |
| aaatcgta | tgagggcgac | cgcaattctc | agtgagctgt | tatgttttat | tccagctgtc | 480 |
| atgttggtatt | gtcgttggat | gggacttaac | tacttcaatc | aaaacgccat | tgagcaaact | 540 |
| ataatagcgt | ctgctattct | tttcaatcca | tctttaatta | tcatagatca | tggccacttc | 600 |
| cagtacaact | cagttatgct | aggttttgct | ttattatcca | tattaaatct | gttgtacgat | 660 |
| aattttgcat | tagcggctat | ttttttcggt | ctttcaataa | gctttaagca | aatggctctc | 720 |
| tattatagcc | ccatcatggt | tttttacatg | ctgagtggtga | gttggtggcc | tttgaaaaac | 780 |
| ttcaacttgt | tgagattggc | tactatcagt | attgcagtac | tcttgacttt | tgcaactcta | 840 |
| ttactgcctt | ttgtattagt | agatgggatg | tcacaaattg | gccaaatatt | attcagagtt | 900 |
| ttcccgtttt | caagaggctt | gtttgaggat | aaggtggcca | acttttggtg | tacaacgaat | 960 |
| atactggtaa | agtacaaaca | gttattcact | gacaaaaccc | ttactaggat | atcgctagta | 1020 |
| gcaactttga | ttgcaattag | tccgtcttgc | ttcatcattt | ttactcaccc | aaagaagggt | 1080 |
| ttactaccgt | gggctttttg | tgcttgctct | tgggcgttct | atcttttctc | tttccaagtc | 1140 |

```

cacgagaaat cagtttttagt tccattgatg cctaccactc tattactggg agaaaaagac 1200
ttggacatca tctcaatggg ctgctgggatt tctaattatt ccttcttcag catgtggcct 1260
ctattaaaaa gagacgggct ggctttggaa tattttgtct tgggaatatt gagtaattgg 1320
ctgattggaa acctcaattg gattagtaaa tggcttgtcc ccagtttcct gattccaggg 1380
cctactctct ccaaaaaagt tcctaaaaga gatactaaaa cagttgttca tactcactgg 1440
ttttgggggt cagtaacatt cgtttcatac ctcggagcta cagttatcca gttcgtagat 1500
tggctgtacc ttccacctgc caagtatcca gatttgtggg ttattttgaa cactacattg 1560
tcgtttgctt gtttcggggt gttttggcta tggattaact acaatctgta cattttgcgt 1620
gattttaagc ttaaagatgc ttag                                     1644

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<210> 77

<211> 547

<212> PRT

<213> *Pichia pastoris*

<400> 77

```

Met Pro His Lys Arg Thr Pro Ser Ser Ser Leu Leu Tyr Ala Arg Ile
 1          5          10          15
Pro Gly Ile Ser Phe Glu Asn Ser Pro Val Phe Asp Phe Leu Ser Pro
          20          25          30
Phe Gly Pro Ala Pro Asn Gln Trp Val Ala Arg Tyr Ile Ile Ile Ile
 35          40          45
Phe Ala Ile Leu Ile Arg Leu Ala Val Gly Leu Gly Ser Tyr Ser Gly
 50          55          60
Phe Asn Thr Pro Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp
 65          70          75          80
Met Glu Ile Thr Gln His Leu Ser Ile Glu Lys Trp Tyr Phe Tyr Asp
          85          90          95
Leu Gln Tyr Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser
          100          105          110
Tyr Phe Phe Gly Lys Leu Gly Ser Phe Ile Asn Pro Ala Trp Phe Ala
          115          120          125
Leu Asp Val Ser Arg Gly Phe Glu Ser Val Asp Leu Lys Ser Tyr Met
          130          135          140
Arg Ala Thr Ala Ile Leu Ser Glu Leu Leu Cys Phe Ile Pro Ala Val
          145          150          155          160
Ile Trp Tyr Cys Arg Trp Met Gly Leu Asn Tyr Phe Asn Gln Asn Ala
          165          170          175
Ile Glu Gln Thr Ile Ile Ala Ser Ala Ile Leu Phe Asn Pro Ser Leu
          180          185          190
Ile Ile Ile Asp His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly
          195          200          205
Phe Ala Leu Leu Ser Ile Leu Asn Leu Leu Tyr Asp Asn Phe Ala Leu
          210          215          220
Ala Ala Ile Phe Phe Val Leu Ser Ile Ser Phe Lys Gln Met Ala Leu
          225          230          235          240
Tyr Tyr Ser Pro Ile Met Phe Phe Tyr Met Leu Ser Val Ser Cys Trp
          245          250          255
Pro Leu Lys Asn Phe Asn Leu Leu Arg Leu Ala Thr Ile Ser Ile Ala
          260          265          270
Val Leu Leu Thr Phe Ala Thr Leu Leu Leu Pro Phe Val Leu Val Asp
          275          280          285
Gly Met Ser Gln Ile Gly Gln Ile Leu Phe Arg Val Phe Pro Phe Ser
          290          295          300
Arg Gly Leu Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Thr Thr Asn
          305          310          315          320
Ile Leu Val Lys Tyr Lys Gln Leu Phe Thr Asp Lys Thr Leu Thr Arg
          325          330          335

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Ile Ser Leu Val Ala Thr Leu Ile Ala Ile Ser Pro Ser Cys Phe Ile
      340                      345                      350
Ile Phe Thr His Pro Lys Lys Val Leu Leu Pro Trp Ala Phe Ala Ala
      355                      360                      365
Cys Ser Trp Ala Phe Tyr Leu Phe Ser Phe Gln Val His Glu Lys Ser
      370                      375                      380
Val Leu Val Pro Leu Met Pro Thr Thr Leu Leu Leu Val Glu Lys Asp
      385                      390                      395                      400
Leu Asp Ile Ile Ser Met Val Cys Trp Ile Ser Asn Ile Ala Phe Phe
      405                      410                      415
Ser Met Trp Pro Leu Leu Lys Arg Asp Gly Leu Ala Leu Glu Tyr Phe
      420                      425                      430
Val Leu Gly Ile Leu Ser Asn Trp Leu Ile Gly Asn Leu Asn Trp Ile
      435                      440                      445
Ser Lys Trp Leu Val Pro Ser Phe Leu Ile Pro Gly Pro Thr Leu Ser
      450                      455                      460
Lys Lys Val Pro Lys Arg Asp Thr Lys Thr Val Val His Thr His Trp
      465                      470                      475                      480
Phe Trp Gly Ser Val Thr Phe Val Ser Tyr Leu Gly Ala Thr Val Ile
      485                      490                      495
Gln Phe Val Asp Trp Leu Tyr Leu Pro Pro Ala Lys Tyr Pro Asp Leu
      500                      505                      510
Trp Val Ile Leu Asn Thr Thr Leu Ser Phe Ala Cys Phe Gly Leu Phe
      515                      520                      525
Trp Leu Trp Ile Asn Tyr Asn Leu Tyr Ile Leu Arg Asp Phe Lys Leu
      530                      535                      540
Lys Asp Ala
545

```

<210> 78

<211> 527

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (23)...(37)

<223> Xaa is a variable amino acid

<220>

<221> MOD_RES

<222> (366)...(378)

<223> Xaa is a variable amino acid

<400> 78

```

Ser Phe Glu Asn Ser Pro Val Phe Asp Phe Leu Ser Pro Phe Gly Pro
  1                      5                      10                      15
Ala Pro Asn Gln Trp Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      20                      25                      30
Xaa Xaa Xaa Xaa Xaa Val Gly Leu Gly Ser Tyr Ser Gly Phe Asn Thr
      35                      40                      45
Pro Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile
      50                      55                      60
Thr Gln His Leu Ser Ile Glu Lys Trp Tyr Phe Tyr Asp Leu Gln Tyr
      65                      70                      75                      80
Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Phe Phe
      85                      90                      95

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- 46 -

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 79

```

Ser Phe Tyr Ala Ser Pro Met Tyr Asp Phe Leu Tyr Pro Phe Arg Pro
 1      5      10      15
Val Gly Asn Gln Trp Leu Pro Glu Tyr Ile Ile Phe Val Cys Ala Val
      20      25      30
Ile Leu Arg Cys Thr Ile Gly Leu Gly Pro Tyr Ser Gly Lys Gly Ser
      35      40      45
Pro Pro Leu Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile
 50      55      60
Thr Gln His Leu Pro Leu Ser Lys Trp Tyr Trp Tyr Asp Leu Gln Tyr
65      70      75      80
Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Leu Leu
      85      90      95
Gly Leu Ile Gly Ser Phe Phe Asn Pro Ser Trp Phe Ala Leu Glu Lys
      100      105      110
Ser Arg Gly Phe Glu Ser Pro Asp Asn Gly Leu Lys Thr Tyr Met Arg
      115      120      125
Ser Thr Val Ile Ile Ser Asp Ile Leu Phe Tyr Phe Pro Ala Val Ile
      130      135      140
Tyr Phe Thr Lys Trp Leu Gly Arg Tyr Arg Asn Gln Ser Pro Ile Gly
145      150      155      160
Gln Ser Ile Ala Ala Ser Ala Ile Leu Phe Gln Pro Ser Leu Met Leu
      165      170      175
Ile Asp His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly Leu Thr
      180      185      190
Ala Tyr Ala Ile Asn Asn Leu Leu Asp Glu Tyr Tyr Ala Met Ala Ala
      195      200      205
Val Cys Phe Val Leu Ser Ile Cys Phe Lys Gln Met Ala Leu Tyr Tyr
      210      215      220
Ala Pro Ile Phe Phe Ala Tyr Leu Leu Ser Arg Ser Leu Leu Phe Pro
225      230      235      240
Lys Phe Asn Ile Ala Arg Leu Thr Val Ile Ala Phe Ala Thr Leu Ala
      245      250      255
Thr Phe Ala Ile Ile Phe Ala Pro Leu Tyr Phe Leu Gly Gly Gly Leu
      260      265      270
Lys Asn Ile His Gln Cys Ile His Arg Ile Phe Pro Phe Ala Arg Gly
      275      280      285
Ile Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Val Thr Asn Val Phe
      290      295      300
Val Lys Tyr Lys Glu Arg Phe Thr Ile Gln Gln Leu Gln Leu Tyr Ser
305      310      315      320
Leu Ile Ala Thr Val Ile Gly Phe Leu Pro Ala Met Ile Met Thr Leu
      325      330      335
Leu His Pro Lys Lys His Leu Leu Pro Tyr Val Leu Ile Ala Cys Ser
      340      345      350
Met Ser Phe Phe Leu Phe Ser Phe Gln Val His Glu Lys Thr Ile Leu
      355      360      365
Ile Pro Leu Leu Pro Ile Thr Leu Leu Tyr Ser Ser Thr Asp Trp Asn
      370      375      380
Val Leu Ser Leu Val Ser Trp Ile Asn Asn Val Ala Leu Phe Thr Leu
385      390      395      400
Trp Pro Leu Leu Lys Lys Asp Gly Leu His Leu Gln Tyr Ala Val Ser
      405      410      415
Phe Leu Leu Ser Asn Trp Leu Ile Gly Asn Phe Ser Phe Ile Thr Pro
      420      425      430

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Arg Phe Leu Pro Lys Ser Leu Thr Pro Gly Pro Ser Ile Ser Ser Ile
      435                      440                      445
Asn Ser Asp Tyr Arg Arg Arg Ser Leu Leu Pro Tyr Asn Val Val Trp
      450                      455                      460
Lys Ser Phe Ile Ile Gly Thr Tyr Ile Ala Met Gly Phe Tyr His Phe
465      470                      475                      480
Leu Asp Gln Phe Val Ala Pro Pro Ser Lys Tyr Pro Asp Leu Trp Val
      485                      490                      495
Leu Leu Asn Cys Ala Val Gly Phe Ile Cys Phe Ser Ile Phe Trp Leu
      500                      505                      510
Trp Ser Tyr Tyr Lys Ile Phe Thr Ser Gly Ser Lys Ser Met Lys Asp
      515                      520                      525

```

<210> 80

<211> 511

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (22)...(36)

<223> Xaa is a variable amino acid

<220>

<221> MOD_RES

<222> (365)...(377)

<223> Xaa is a variable amino acid

<400> 80

```

Phe Glu Asn Ser Pro Val Phe Asp Phe Leu Ser Pro Phe Gly Pro Ala
1      5      10      15
Pro Asn Gln Trp Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      20      25      30
Xaa Xaa Xaa Xaa Val Gly Leu Gly Ser Tyr Ser Gly Phe Asn Thr Pro
      35      40      45
Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile Thr
      50      55      60
Gln His Leu Ser Ile Glu Lys Trp Tyr Phe Tyr Asp Leu Gln Tyr Trp
65      70      75      80
Gly Leu Asp Tyr Pro Leu Thr Ala Phe His Ser Tyr Phe Phe Gly
      85      90      95
Lys Leu Gly Ser Phe Ile Asn Pro Ala Trp Phe Ala Leu Asp Val Ser
      100     105     110
Arg Gly Phe Glu Ser Val Asp Leu Lys Ser Tyr Met Arg Ala Thr Ala
      115     120     125
Ile Leu Ser Glu Leu Leu Cys Phe Ile Pro Ala Val Ile Trp Tyr Cys
      130     135     140
Arg Trp Met Gly Leu Asn Tyr Phe Asn Gln Asn Ala Ile Glu Gln Thr
145     150     155     160
Ile Ile Ala Ser Ala Ile Leu Phe Asn Pro Ser Leu Ile Ile Ile Asp
      165     170     175
His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly Phe Ala Leu Leu
      180     185     190
Ser Ile Leu Asn Leu Leu Tyr Asp Asn Phe Ala Leu Ala Ala Ile Phe
      195     200     205
Phe Val Leu Ser Ile Ser Phe Lys Gln Met Ala Leu Tyr Tyr Ser Pro
      210     215     220

```



```

Ile Met Phe Phe Tyr Met Leu Ser Val Ser Cys Trp Pro Leu Lys Asn
225                230                235                240
Phe Asn Leu Leu Arg Leu Ala Thr Ile Ser Ile Ala Val Leu Leu Thr
                245                250                255
Phe Ala Thr Leu Leu Leu Pro Phe Val Leu Val Asp Gly Met Ser Gln
                260                265                270
Ile Gly Gln Ile Leu Phe Arg Val Phe Pro Phe Ser Arg Gly Leu Phe
                275                280                285
Glu Asp Lys Val Ala Asn Phe Trp Cys Thr Thr Asn Ile Leu Val Lys
                290                295                300
Tyr Lys Gln Leu Phe Thr Asp Lys Thr Leu Thr Arg Ile Ser Leu Val
305                310                315                320
Ala Thr Leu Ile Ala Ile Ser Pro Ser Cys Phe Ile Ile Phe Thr His
                325                330                335
Pro Lys Lys Val Leu Leu Pro Trp Ala Phe Ala Ala Cys Ser Trp Ala
                340                345                350
Phe Tyr Leu Phe Ser Phe Gln Val His Glu Lys Ser Xaa Xaa Xaa Xaa
                355                360                365
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Glu Lys Asp Leu Asp Ile Ile
                370                375                380
Ser Met Val Cys Trp Ile Ser Asn Ile Ala Phe Phe Ser Met Trp Pro
385                390                395                400
Leu Leu Lys Arg Asp Gly Leu Ala Leu Glu Tyr Phe Val Leu Gly Ile
                405                410                415
Leu Ser Asn Trp Leu Ile Gly Asn Leu Asn Trp Ile Ser Lys Trp Leu
                420                425                430
Val Pro Ser Phe Leu Ile Pro Gly Pro Thr Leu Ser Lys Lys Val Pro
                435                440                445
Lys Arg Asp Thr Lys Thr Val Val His Thr His Trp Phe Trp Gly Ser
                450                455                460
Val Thr Phe Val Ser Tyr Leu Gly Ala Thr Val Ile Gln Phe Val Asp
465                470                475                480
Trp Leu Tyr Leu Pro Pro Ala Lys Tyr Pro Asp Leu Trp Val Ile Leu
                485                490                495
Asn Thr Thr Leu Ser Phe Ala Cys Phe Gly Leu Phe Trp Leu Trp
                500                505                510

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<210> 81

<211> 480

<212> PRT

<213> Schizosaccharomyces pombe

<400> 81

```

Phe Glu Asn Gly Ala Pro Val Gln Gln Phe Val Ser Arg Phe Arg Ser
1                5                10                15
Tyr Ser Ser Lys Phe Leu Phe Phe Pro Cys Leu Ile Met Ser Leu Val
                20                25                30
Phe Met Gln Trp Leu Ile Ser Ile Gly Pro Tyr Ser Gly Tyr Asn Thr
                35                40                45
Pro Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Leu
50                55                60
Thr Leu His Thr Pro Val Ser Gln Trp Tyr Phe Arg Asp Leu Gln Trp
65                70                75                80
Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Tyr Val Ser Trp Phe Phe
                85                90                95
Gly Ile Ile Gly His Tyr Phe Phe Asn Pro Glu Trp Phe Ala Asp Val
                100                105                110

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Thr Ser Arg Gly Phe Glu Ser Leu Glu Leu Lys Leu Phe Met Arg Ser
115 120 125
Thr Val Ile Ala Ser His Leu Leu Ile Leu Val Pro Pro Leu Met Phe
130 135 140
Tyr Ser Lys Trp Trp Ser Arg Arg Ile Pro Asn Phe Val Asp Arg Asn
145 150 155 160
Ala Ser Leu Ile Met Val Leu Phe Gln Pro Ala Leu Leu Leu Ile Asp
165 170 175
His Gly His Phe Gln Tyr Asn Cys Val Met Leu Gly Leu Val Met Tyr
180 185 190
Ala Ile Ala Asn Leu Leu Lys Asn Gln Tyr Val Ala Ala Thr Phe Phe
195 200 205
Phe Cys Leu Ala Leu Thr Phe Lys Gln Met Ala Leu Tyr Phe Ala Pro
210 215 220
Pro Ile Phe Phe Tyr Leu Leu Gly Thr Cys Val Lys Pro Lys Ile Arg
225 230 235 240
Phe Ser Arg Phe Ile Leu Leu Ser Val Thr Val Val Phe Thr Phe Ser
245 250 255
Leu Ile Leu Phe Pro Trp Ile Tyr Met Asp Tyr Lys Thr Leu Leu Pro
260 265 270
Gln Ile Leu His Arg Val Phe Pro Phe Ala Arg Gly Leu Trp Glu Asp
275 280 285
Lys Val Ala Asn Phe Trp Cys Thr Leu Asn Thr Val Phe Lys Ile Arg
290 295 300
Glu Val Phe Thr Leu His Gln Leu Gln Val Ile Ser Leu Ile Phe Thr
305 310 315 320
Leu Ile Ser Ile Leu Pro Ser Cys Val Ile Leu Phe Leu Tyr Pro Arg
325 330 335
Lys Arg Leu Leu Ala Leu Gly Phe Ala Ser Ala Ser Trp Gly Phe Phe
340 345 350
Leu Phe Ser Phe Gln Val His Glu Lys Ser Val Leu Leu Pro Leu Leu
355 360 365
Pro Thr Ser Ile Leu Leu Cys His Gly Asn Ile Thr Thr Lys Pro Trp
370 375 380
Ile Ala Leu Ala Asn Asn Leu Ala Val Phe Ser Leu Trp Pro Leu Leu
385 390 395 400
Lys Lys Asp Gly Leu Gly Leu Gln Tyr Phe Thr Leu Val Leu Met Trp
405 410 415
Asn Trp Ile Gly Asp Met Val Val Phe Ser Lys Asn Val Leu Phe Arg
420 425 430
Phe Ile Gln Leu Ser Phe Tyr Val Gly Met Ile Val Ile Leu Gly Ile
435 440 445
Asp Leu Phe Ile Pro Pro Pro Ser Arg Tyr Pro Asp Leu Trp Val Ile
450 455 460
Leu Asn Val Thr Leu Ser Phe Ala Gly Phe Phe Thr Ile Tyr Leu Trp
465 470 475 480

```

<210> 82

<211> 477

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (329)...(341)

<223> Xaa is a variable amino acid

<400> 82

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Gly | Leu | Gly | Ser | Tyr | Ser | Gly | Phe | Asn | Thr | Pro | Pro | Met | Tyr | Gly |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Asp | Phe | Glu | Ala | Gln | Arg | His | Trp | Met | Glu | Ile | Thr | Gln | His | Leu | Ser |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ile | Glu | Lys | Trp | Tyr | Phe | Tyr | Asp | Leu | Gln | Tyr | Trp | Gly | Leu | Asp | Tyr |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Pro | Pro | Leu | Thr | Ala | Phe | His | Ser | Tyr | Phe | Phe | Gly | Lys | Leu | Gly | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Phe | Ile | Asn | Pro | Ala | Trp | Phe | Ala | Leu | Asp | Val | Ser | Arg | Gly | Phe | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ser | Val | Asp | Leu | Lys | Ser | Tyr | Met | Arg | Ala | Thr | Ala | Ile | Leu | Ser | Glu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Leu | Leu | Cys | Phe | Ile | Pro | Ala | Val | Ile | Trp | Tyr | Cys | Arg | Trp | Met | Gly |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Asn | Tyr | Phe | Asn | Gln | Asn | Ala | Ile | Glu | Gln | Thr | Ile | Ile | Ala | Ser |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Ala | Ile | Leu | Phe | Asn | Pro | Ser | Leu | Ile | Ile | Ile | Asp | His | Gly | His | Phe |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Gln | Tyr | Asn | Ser | Val | Met | Leu | Gly | Phe | Ala | Leu | Leu | Ser | Ile | Leu | Asn |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Leu | Leu | Tyr | Asp | Asn | Phe | Ala | Leu | Ala | Ala | Ile | Phe | Phe | Val | Leu | Ser |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Ile | Ser | Phe | Lys | Gln | Met | Ala | Leu | Tyr | Tyr | Ser | Pro | Ile | Met | Phe | Phe |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Tyr | Met | Leu | Ser | Val | Ser | Cys | Trp | Pro | Leu | Lys | Asn | Phe | Asn | Leu | Leu |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Arg | Leu | Ala | Thr | Ile | Ser | Ile | Ala | Val | Leu | Leu | Thr | Phe | Ala | Thr | Leu |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Leu | Leu | Pro | Phe | Val | Leu | Val | Asp | Gly | Met | Ser | Gln | Ile | Gly | Gln | Ile |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Phe | Arg | Val | Phe | Pro | Phe | Ser | Arg | Gly | Leu | Phe | Glu | Asp | Lys | Val |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ala | Asn | Phe | Trp | Cys | Thr | Thr | Asn | Ile | Leu | Val | Lys | Tyr | Lys | Gln | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Phe | Thr | Asp | Lys | Thr | Leu | Thr | Arg | Ile | Ser | Leu | Val | Ala | Thr | Leu | Ile |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Ala | Ile | Ser | Pro | Ser | Cys | Phe | Ile | Ile | Phe | Thr | His | Pro | Lys | Lys | Val |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Leu | Leu | Pro | Trp | Ala | Phe | Ala | Ala | Cys | Ser | Trp | Ala | Phe | Tyr | Leu | Phe |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ser | Phe | Gln | Val | His | Glu | Lys | Ser | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa |
| | | | | 325 | | | | 330 | | | | | | 335 | |
| Xaa | Xaa | Xaa | Xaa | Xaa | Glu | Lys | Asp | Leu | Asp | Ile | Ile | Ser | Met | Val | Cys |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Trp | Ile | Ser | Asn | Ile | Ala | Phe | Phe | Ser | Met | Trp | Pro | Leu | Leu | Lys | Arg |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Asp | Gly | Leu | Ala | Leu | Glu | Tyr | Phe | Val | Leu | Gly | Ile | Leu | Ser | Asn | Trp |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Leu | Ile | Gly | Asn | Leu | Asn | Trp | Ile | Ser | Lys | Trp | Leu | Val | Pro | Ser | Phe |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Leu | Ile | Pro | Gly | Pro | Thr | Leu | Ser | Lys | Lys | Val | Pro | Lys | Arg | Asp | Thr |
| | | | | 405 | | | | | 410 | | | | | 415 | |
| Lys | Thr | Val | Val | His | Thr | His | Trp | Phe | Trp | Gly | Ser | Val | Thr | Phe | Val |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Ser | Tyr | Leu | Gly | Ala | Thr | Val | Ile | Gln | Phe | Val | Asp | Trp | Leu | Tyr | Leu |
| | | 435 | | | | | 440 | | | | 445 | | | | |
| Pro | Pro | Ala | Lys | Tyr | Pro | Asp | Leu | Trp | Val | Ile | Leu | Asn | Thr | Thr | Leu |

450 455 460
 Ser Phe Ala Cys Phe Gly Leu Phe Trp Leu Trp Ile Asn
 465 470 475

<210> 83
 <211> 448
 <212> PRT
 <213> *Drosophila melanogaster*

<400> 83
 Ile Ser Leu Tyr Ser Tyr Ser Gly Phe Asp Ser Pro Pro Met His Gly
 1 5 10 15
 Asp Tyr Glu Ala Gln Arg His Trp Gln Glu Ile Thr Val Asn Leu Ala
 20 25 30
 Val Gly Glu Trp Tyr Thr Asn Ser Ser Asn Asn Asp Leu Gln Tyr Trp
 35 40 45
 Gly Leu Asp Tyr Pro Pro Leu Thr Ala Tyr His Ser Tyr Leu Val Gly
 50 55 60
 Arg Ile Gly Ala Ser Ile Asp Pro Arg Phe Val Glu Leu His Lys Ser
 65 70 75 80
 Arg Gly Phe Glu Ser Lys Glu His Lys Arg Phe Met Arg Ala Thr Val
 85 90 95
 Val Ser Ala Asp Val Leu Ile Tyr Leu Pro Ala Met Leu Leu Leu Ala
 100 105 110
 Tyr Ser Leu Asp Lys Ala Phe Arg Ser Asp Asp Lys Leu Phe Leu Phe
 115 120 125
 Thr Leu Val Ala Ala Tyr Pro Gly Gln Thr Leu Ile Asp Asn Gly His
 130 135 140
 Phe Gln Tyr Asn Asn Ile Ser Leu Gly Phe Ala Ala Val Ala Ile Ala
 145 150 155 160
 Ala Ile Leu Arg Arg Arg Phe Tyr Ala Ala Phe Phe Phe Thr Leu
 165 170 175
 Ala Leu Asn Tyr Lys Gln Met Glu Leu Tyr His Ser Leu Pro Phe Phe
 180 185 190
 Ala Phe Leu Leu Gly Glu Cys Val Ser Gln Lys Ser Phe Ala Ser Phe
 195 200 205
 Ile Ala Glu Ile Ser Arg Ile Ala Ala Val Val Leu Gly Thr Phe Ala
 210 215 220
 Ile Leu Trp Val Pro Trp Leu Gly Ser Leu Gln Ala Val Leu Gln Val
 225 230 235 240
 Leu His Arg Leu Phe Pro Val Ala Arg Gly Val Phe Glu Asp Lys Val
 245 250 255
 Ala Asn Val Trp Cys Ala Val Asn Val Val Trp Lys Leu Lys Lys His
 260 265 270
 Ile Ser Asn Asp Gln Met Ala Leu Val Cys Ile Ala Cys Thr Leu Ile
 275 280 285
 Ala Ser Leu Pro Thr Asn Val Leu Leu Phe Arg Arg Arg Thr Asn Val
 290 295 300
 Gly Phe Leu Leu Ala Leu Phe Asn Thr Ser Leu Ala Phe Phe Leu Phe
 305 310 315 320
 Ser Phe Gln Val His Glu Lys Thr Ile Leu Leu Thr Ala Leu Pro Ala
 325 330 335
 Leu Phe Leu Leu Lys Cys Trp Pro Asp Glu Met Ile Leu Phe Leu Glu
 340 345 350
 Val Thr Val Phe Ser Met Leu Pro Leu Leu Ala Arg Asp Glu Leu Leu
 355 360 365
 Val Pro Ala Val Val Ala Thr Val Ala Phe His Leu Ile Phe Lys Cys

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 370 | | 375 | | 380 | | | | | | | | | | | |
| Phe | Asp | Ser | Lys | Ser | Lys | Leu | Ser | Asn | Glu | Tyr | Pro | Leu | Lys | Tyr | Ile |
| 385 | | | | 390 | | | | | | 395 | | | | | 400 |
| Ala | Asn | Ile | Ser | Gln | Ile | Leu | Met | Ile | Ser | Val | Val | Val | Ala | Ser | Leu |
| | | | | 405 | | | | | | 410 | | | | | 415 |
| Thr | Val | Pro | Ala | Pro | Thr | Lys | Tyr | Pro | Asp | Leu | Trp | Pro | Leu | Ile | Ile |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Ser | Val | Thr | Ser | Cys | Gly | His | Phe | Phe | Leu | Phe | Phe | Leu | Trp | Gly | Asn |
| | | 435 | | | | | 440 | | | | | 445 | | | |

<210> 84

<211> 478

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD_RES

<222> (324)...(336)

<223> Xaa is a variable amino acid

<400> 84

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Ser | Gly | Phe | Asn | Thr | Pro | Pro | Met | Tyr | Gly | Asp | Phe | Glu | Ala | Gln |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Arg | His | Trp | Met | Glu | Ile | Thr | Gln | His | Leu | Ser | Ile | Glu | Lys | Trp | Tyr |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Phe | Tyr | Asp | Leu | Gln | Tyr | Trp | Gly | Leu | Asp | Tyr | Pro | Pro | Leu | Thr | Ala |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Phe | His | Ser | Tyr | Phe | Phe | Gly | Lys | Leu | Gly | Ser | Phe | Ile | Asn | Pro | Ala |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Trp | Phe | Ala | Leu | Asp | Val | Ser | Arg | Gly | Phe | Glu | Ser | Val | Asp | Leu | Lys |
| 65 | | | | 70 | | | | | | 75 | | | | | 80 |
| Ser | Tyr | Met | Arg | Ala | Thr | Ala | Ile | Leu | Ser | Glu | Leu | Leu | Cys | Phe | Ile |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Pro | Ala | Val | Ile | Trp | Tyr | Cys | Arg | Trp | Met | Gly | Leu | Asn | Tyr | Phe | Asn |
| | | 100 | | | | | | 105 | | | | | 110 | | |
| Gln | Asn | Ala | Ile | Glu | Gln | Thr | Ile | Ile | Ala | Ser | Ala | Ile | Leu | Phe | Asn |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Pro | Ser | Leu | Ile | Ile | Ile | Asp | His | Gly | His | Phe | Gln | Tyr | Asn | Ser | Val |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Met | Leu | Gly | Phe | Ala | Leu | Leu | Ser | Ile | Leu | Asn | Leu | Leu | Tyr | Asp | Asn |
| 145 | | | | 150 | | | | | | 155 | | | | | 160 |
| Phe | Ala | Leu | Ala | Ala | Ile | Phe | Phe | Val | Leu | Ser | Ile | Ser | Phe | Lys | Gln |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Met | Ala | Leu | Tyr | Tyr | Ser | Pro | Ile | Met | Phe | Phe | Tyr | Met | Leu | Ser | Val |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Ser | Cys | Trp | Pro | Leu | Lys | Asn | Phe | Asn | Leu | Leu | Arg | Leu | Ala | Thr | Ile |
| | 195 | | | | | 200 | | | | | | 205 | | | |
| Ser | Ile | Ala | Val | Leu | Leu | Thr | Phe | Ala | Thr | Leu | Leu | Leu | Pro | Phe | Val |
| | 210 | | | | | 215 | | | | | | 220 | | | |
| Leu | Val | Asp | Gly | Met | Ser | Gln | Ile | Gly | Gln | Ile | Leu | Phe | Arg | Val | Phe |
| 225 | | | | 230 | | | | | 235 | | | | | | 240 |
| Pro | Phe | Ser | Arg | Gly | Leu | Phe | Glu | Asp | Lys | Val | Ala | Asn | Phe | Trp | Cys |
| | | | 245 | | | | | 250 | | | | | | 255 | |
| Thr | Thr | Asn | Ile | Leu | Val | Lys | Tyr | Lys | Gln | Leu | Phe | Thr | Asp | Lys | Thr |
| | | 260 | | | | | 265 | | | | | | 270 | | |
| Leu | Thr | Arg | Ile | Ser | Leu | Val | Ala | Thr | Leu | Ile | Ala | Ile | Ser | Pro | Ser |
| | | 275 | | | | | 280 | | | | | 285 | | | |

```

Cys Phe Ile Ile Phe Thr His Pro Lys Lys Val Leu Leu Pro Trp Ala
 290                295                300
Phe Ala Ala Cys Ser Trp Ala Phe Tyr Leu Phe Ser Phe Gln Val His
305                310                315                320
Glu Lys Ser Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      325                330                335
Glu Lys Asp Leu Asp Ile Ile Ser Met Val Cys Trp Ile Ser Asn Ile
      340                345                350
Ala Phe Phe Ser Met Trp Pro Leu Leu Lys Arg Asp Gly Leu Ala Leu
      355                360                365
Glu Tyr Phe Val Leu Gly Ile Leu Ser Asn Trp Leu Ile Gly Asn Leu
370                375                380
Asn Trp Ile Ser Lys Trp Leu Val Pro Ser Phe Leu Ile Pro Gly Pro
385                390                395                400
Thr Leu Ser Lys Lys Val Pro Lys Arg Asp Thr Lys Thr Val Val His
      405                410                415
Thr His Trp Phe Trp Gly Ser Val Thr Phe Val Ser Tyr Leu Gly Ala
      420                425                430
Thr Val Ile Gln Phe Val Asp Trp Leu Tyr Leu Pro Pro Ala Lys Tyr
      435                440                445
Pro Asp Leu Trp Val Ile Leu Asn Thr Thr Leu Ser Phe Ala Cys Phe
450                455                460
Gly Leu Phe Trp Leu Trp Ile Asn Tyr Asn Leu Tyr Ile Leu
465                470                475

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<210> 85

<211> 459

<212> PRT

<213> Arabidopsis thaliana

<400> 85

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Tyr Ser Gly Ala Gly Ile Pro Pro Lys Phe Gly Asp Phe Glu Ala Gln
 1                5                10                15
Arg His Trp Met Glu Ile Thr Thr Asn Leu Pro Val Ile Asp Trp Tyr
      20                25                30
Arg Asn Gly Thr Tyr Asn Asp Leu Thr Tyr Trp Gly Leu Asp Tyr Pro
      35                40                45
Pro Leu Thr Ala Tyr Gln Ser Tyr Ile His Gly Ile Phe Leu Arg Phe
      50                55                60
Phe Asn Pro Glu Ser Val Ala Leu Leu Ser Ser Arg Gly His Glu Ser
      65                70                75                80
Tyr Leu Gly Lys Leu Leu Met Arg Trp Thr Val Leu Ser Ser Asp Ala
      85                90                95
Phe Ile Phe Phe Pro Ala Ala Leu Phe Phe Val Leu Val Tyr His Arg
      100               105               110
Asn Arg Thr Arg Gly Gly Lys Ser Glu Val Ala Trp His Ile Ala Met
      115               120               125
Ile Leu Leu Asn Pro Cys Leu Ile Leu Ile Asp His Gly His Phe Gln
      130               135               140
Tyr Asn Cys Ile Ser Leu Gly Leu Thr Val Gly Ala Ile Ala Ala Val
      145               150               155               160
Leu Cys Glu Ser Glu Val Leu Thr Cys Val Leu Phe Ser Leu Ala Leu
      165               170               175
Ser His Lys Gln Met Ser Ala Tyr Phe Ala Pro Ala Phe Phe Ser His
      180               185               190
Leu Leu Gly Lys Cys Leu Arg Arg Lys Ser Pro Ile Leu Ser Val Ile
      195               200               205

```

Lys Leu Gly Ile Ala Val Ile Val Thr Phe Val Ile Phe Trp Trp Pro
 210 215 220
 Tyr Val His Ser Leu Asp Asp Phe Leu Met Val Leu Ser Arg Leu Ala
 225 230 235 240
 Pro Phe Glu Arg Gly Ile Tyr Glu Asp Tyr Val Ala Asn Phe Trp Cys
 245 250 255
 Thr Thr Ser Ile Leu Ile Lys Trp Lys Asn Leu Phe Thr Thr Gln Ser
 260 265 270
 Leu Lys Ser Ile Ser Leu Ala Ala Thr Ile Leu Ala Ser Leu Pro Ser
 275 280 285
 Met Val Gln Gln Ile Leu Ser Pro Ser Asn Glu Gly Phe Leu Tyr Gly
 290 295 300
 Leu Leu Asn Ser Ser Met Ala Phe Tyr Leu Phe Ser Phe Gln Val His
 305 310 315 320
 Glu Lys Ser Ile Leu Met Pro Phe Leu Ser Ala Thr Leu Leu Ala Leu
 325 330 335
 Lys Leu Pro Asp His Phe Ser His Leu Thr Tyr Tyr Ala Leu Phe Ser
 340 345 350
 Met Phe Pro Leu Leu Cys Arg Asp Lys Leu Leu Ile Pro Tyr Leu Thr
 355 360 365
 Leu Ser Phe Leu Phe Thr Val Ile Tyr His Ser Pro Gly Asn His His
 370 375 380
 Ala Ile Gln Lys Thr Asp Val Ser Phe Phe Ser Phe Lys Asn Phe Pro
 385 390 395 400
 Gly Tyr Val Phe Leu Leu Arg Thr His Phe Phe Ile Ser Val Val Leu
 405 410 415
 His Val Leu Tyr Leu Thr Ile Lys Pro Pro Gln Lys Tyr Pro Phe Leu
 420 425 430
 Phe Glu Ala Leu Ile Met Ile Leu Cys Phe Ser Tyr Phe Ile Met Phe
 435 440 445
 Ala Phe Tyr Thr Asn Tyr Thr Gln Trp Thr Leu
 450 455

<210> 86

<211> 836

<212> DNA

<213> Kluyveromyces lactis

<400> 86

atctctgttt caacagctct tgcattcatt ggttcttttcg gtccaatcta tatcttttga 60
 ggatacaaga acttagtgca atcaatgcac aggatcttttc catttgccag gggatatcttt 120
 gaagataaag ttgcgaatth ttggtgcgtt tctaataatt tcatacaata tagaaatcta 180
 ttcactcaga aggatcttca attataactca ttactcgcaa cagttatttg gctttttacca 240
 tcattcatta taacattttt ataccggaag agacattttac taccatatgc tttggccgca 300
 tgttcgaagt cattcttctt attcagcttc caggttcatg aaaagacaat cttattacct 360
 ttacttccta ttacactctt gtacacgtca agagattgga atgttctatc attgggtttgt 420
 tggattaaca acgtggcatt gtttacactc tggccattac tgaaaaagga caatctagta 480
 ttgcaatatg gagtcagtgt catgttttagc aattggttga tgcgtaactt cagtttctgc 540
 acaccacgtc tcctcccaaa attttttgaca ccagggccat ccatcagtga tatagatgtt 600
 gattatagac gggcaagttt actaccaag agcctaatat ggagattaat cattgtttggc 660
 tcatatattg caatggggat tattcatttt tcagactatt acgtctcccc gccatcaaaa 720
 taccctgatt tatgggtgct tgccaattgt tccttgggct tctcatgttt tgtgacattt 780
 tggatatgga acaattataa ttattcgaaa tgagaaacag cactttgcaa gattta 836

<210> 87

<211> 277

<212> PRT

<213> Kluyveromyces lactis

<400> 87

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Ile Ser Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile
 1           5           10           15
Tyr Ile Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile
          20           25           30
Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp
          35           40           45
Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys
          50           55           60
Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro
65           70           75           80
Ser Phe Ile Ile Thr Phe Leu Tyr Pro Lys Arg His Leu Leu Pro Tyr
          85           90           95
Ala Leu Ala Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln Val
          100          105          110
His Glu Lys Thr Ile Leu Leu Pro Leu Leu Pro Ile Thr Leu Leu Tyr
          115          120          125
Thr Ser Arg Asp Trp Asn Val Leu Ser Leu Val Cys Trp Ile Asn Asn
          130          135          140
Val Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Asn Leu Val
145          150          155          160
Leu Gln Tyr Gly Val Met Phe Met Phe Ser Asn Trp Leu Ile Gly Asn
          165          170          175
Phe Ser Phe Val Thr Pro Arg Phe Leu Pro Lys Phe Leu Thr Pro Gly
          180          185          190
Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg Ala Ser Leu Leu
          195          200          205
Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly Ser Tyr Ile Ala
          210          215          220
Met Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser Pro Pro Ser Lys
225          230          235          240
Tyr Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu Gly Phe Ser Cys
          245          250          255
Phe Val Thr Phe Trp Ile Trp Asn Asn Tyr Asn Tyr Ser Lys Glu Thr
          260          265          270
Ala Leu Cys Lys Ile
          275

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<210> 88

<211> 284

<212> PRT

<213> Kluyveromyces lactis

<220>

<221> MOD_RES

<222> (116)...(127)

<223> Xaa is a variable amino acid

<220>

<221> MOD_RES

<222> 271

<223> Xaa is a variable amino acid

<400> 88

```

Ile Ser Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile

```


| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | |
| Tyr | Ile | Phe | Gly | Gly | Tyr | Lys | Asn | Leu | Val | Gln | Ser | Met | His | Arg | Ile | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |
| Phe | Pro | Phe | Ala | Arg | Gly | Ile | Phe | Glu | Asp | Lys | Val | Ala | Asn | Phe | Trp | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | |
| Cys | Val | Ser | Asn | Ile | Phe | Ile | Lys | Tyr | Arg | Asn | Leu | Phe | Thr | Gln | Lys | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Asp | Leu | Gln | Leu | Tyr | Ser | Leu | Leu | Ala | Thr | Val | Ile | Gly | Leu | Leu | Pro | | |
| 65 | | | | 70 | | | | | 75 | | | | | | 80 | | |
| Ser | Phe | Ile | Ile | Thr | Phe | Leu | Tyr | Pro | Lys | Arg | His | Leu | Leu | Pro | Tyr | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| Ala | Leu | Ala | Ala | Cys | Ser | Met | Ser | Phe | Phe | Leu | Phe | Ser | Phe | Gln | Val | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| His | Glu | Lys | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Tyr | | |
| | 115 | | | | | | 120 | | | | | 125 | | | | | |
| Thr | Ser | Arg | Asp | Trp | Asn | Val | Leu | Ser | Leu | Val | Cys | Trp | Ile | Asn | Asn | | |
| | 130 | | | | 135 | | | | | | 140 | | | | | | |
| Val | Ala | Leu | Phe | Thr | Leu | Trp | Pro | Leu | Leu | Lys | Lys | Asp | Asn | Leu | Val | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Leu | Gln | Tyr | Gly | Val | Met | Phe | Met | Phe | Ser | Asn | Trp | Leu | Ile | Gly | Asn | | |
| | | | 165 | | | | | | 170 | | | | | 175 | | | |
| Phe | Ser | Phe | Val | Thr | Pro | Arg | Phe | Leu | Pro | Lys | Phe | Leu | Thr | Pro | Gly | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Pro | Ser | Ile | Ser | Asp | Ile | Asp | Val | Asp | Tyr | Arg | Arg | Ala | Ser | Leu | Leu | | |
| | | 195 | | | | 200 | | | | | | 205 | | | | | |
| Pro | Lys | Ser | Leu | Ile | Trp | Arg | Leu | Ile | Ile | Val | Gly | Ser | Tyr | Ile | Ala | | |
| | 210 | | | | 215 | | | | | | 220 | | | | | | |
| Met | Gly | Ile | Ile | His | Phe | Leu | Asp | Tyr | Tyr | Val | Ser | Pro | Pro | Ser | Gln | | |
| 225 | | | | 230 | | | | | | 235 | | | | | 240 | | |
| Glu | Arg | Tyr | Lys | Tyr | Pro | Asp | Leu | Trp | Val | Leu | Ala | Asn | Cys | Ser | Leu | | |
| | | | 245 | | | | | | 250 | | | | | 255 | | | |
| Gly | Phe | Ser | Cys | Phe | Val | Thr | Phe | Trp | Ile | Trp | Asn | Asn | Tyr | Xaa | Leu | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Phe | Glu | Arg | Met | Arg | Asn | Ser | Thr | Leu | Gln | Asp | Leu | | | | | | |
| | | 275 | | | | | 280 | | | | | | | | | | |

<210> 89

<211> 280

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 89

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Ile | Ala | Phe | Ala | Thr | Leu | Ala | Thr | Phe | Ala | Ile | Ile | Phe | Ala | Pro | Leu | | |
| 1 | | | | 5 | | | | 10 | | | | 15 | | | | | |
| Tyr | Phe | Leu | Gly | Gly | Gly | Leu | Lys | Asn | Ile | His | Gln | Cys | Ile | His | Arg | | |
| | | | 20 | | | | | 25 | | | | 30 | | | | | |
| Ile | Phe | Pro | Phe | Ala | Arg | Gly | Ile | Phe | Glu | Asp | Lys | Val | Ala | Asn | Phe | | |
| | | 35 | | | | 40 | | | | | 45 | | | | | | |
| Trp | Cys | Val | Thr | Asn | Val | Phe | Val | Lys | Tyr | Lys | Glu | Arg | Phe | Thr | Ile | | |
| | 50 | | | | 55 | | | | | | 60 | | | | | | |
| Gln | Gln | Leu | Gln | Leu | Tyr | Ser | Leu | Ile | Ala | Thr | Val | Ile | Gly | Phe | Leu | | |
| 65 | | | | 70 | | | | | 75 | | | | | | 80 | | |
| Pro | Ala | Met | Ile | Met | Thr | Leu | Leu | His | Pro | Lys | Lys | His | Leu | Leu | Pro | | |
| | | | | 85 | | | | 90 | | | | | | 95 | | | |
| Tyr | Val | Leu | Ile | Ala | Cys | Ser | Met | Ser | Phe | Phe | Leu | Phe | Ser | Phe | Gln | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Val | His | Glu | Lys | Thr | Ile | Leu | Ile | Pro | Leu | Leu | Pro | Ile | Thr | Leu | Leu | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 115 | | | | 120 | | | | 125 | | | | | |
| Tyr | Ser | Ser | Thr | Asp | Trp | Asn | Val | Leu | Ser | Leu | Val | Ser | Trp | Ile | Asn |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Asn | Val | Ala | Leu | Phe | Thr | Leu | Trp | Pro | Leu | Leu | Lys | Lys | Asp | Gly | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| His | Leu | Gln | Tyr | Ala | Val | Ser | Phe | Leu | Leu | Ser | Asn | Trp | Leu | Ile | Gly |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Asn | Phe | Ser | Phe | Ile | Thr | Pro | Arg | Phe | Leu | Pro | Lys | Ser | Leu | Thr | Pro |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gly | Pro | Ser | Ile | Ser | Ser | Ile | Asn | Ser | Asp | Tyr | Arg | Arg | Arg | Ser | Leu |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Leu | Pro | Tyr | Asn | Val | Val | Trp | Lys | Ser | Phe | Ile | Ile | Gly | Thr | Tyr | Ile |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Met | Gly | Phe | Tyr | His | Phe | Leu | Asp | Gln | Phe | Val | Ala | Pro | Pro | Ser |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Lys | Tyr | Pro | Asp | Leu | Trp | Val | Leu | Leu | Asn | Cys | Ala | Val | Gly | Phe | Ile |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Cys | Phe | Ser | Ile | Phe | Trp | Leu | Trp | Ser | Tyr | Tyr | Lys | Ile | Phe | Thr | Ser |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gly | Ser | Lys | Ser | Met | Lys | Asp | Leu | | | | | | | | |
| | | 275 | | | | | 280 | | | | | | | | |

<210> 90

<211> 284

<212> PRT

<213> Kluyveromyces lactis

<220>

<221> MOD_RES

<222> (116)...(127)

<223> Xaa is a variable amino acid

<220>

<221> MOD_RES

<222> 271

<223> Xaa is a variable amino acid

<400> 90

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Ser | Val | Ser | Thr | Ala | Leu | Ala | Phe | Ile | Gly | Ser | Phe | Gly | Pro | Ile |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Tyr | Ile | Phe | Gly | Gly | Tyr | Lys | Asn | Leu | Val | Gln | Ser | Met | His | Arg | Ile |
| | | | 20 | | | | 25 | | | | | | 30 | | |
| Phe | Pro | Phe | Ala | Arg | Gly | Ile | Phe | Glu | Asp | Lys | Val | Ala | Asn | Phe | Trp |
| | | 35 | | | | 40 | | | | | | 45 | | | |
| Cys | Val | Ser | Asn | Ile | Phe | Ile | Lys | Tyr | Arg | Asn | Leu | Phe | Thr | Gln | Lys |
| | 50 | | | | 55 | | | | | 60 | | | | | |
| Asp | Leu | Gln | Leu | Tyr | Ser | Leu | Leu | Ala | Thr | Val | Ile | Gly | Leu | Leu | Pro |
| 65 | | | | | 70 | | | | 75 | | | | | | 80 |
| Ser | Phe | Ile | Ile | Thr | Phe | Leu | Tyr | Pro | Lys | Arg | His | Leu | Leu | Pro | Tyr |
| | | | | 85 | | | | 90 | | | | | | 95 | |
| Ala | Leu | Ala | Ala | Cys | Ser | Met | Ser | Phe | Phe | Leu | Phe | Ser | Phe | Gln | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| His | Glu | Lys | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Tyr |
| | | 115 | | | | 120 | | | | | | 125 | | | |
| Thr | Ser | Arg | Asp | Trp | Asn | Val | Leu | Ser | Leu | Val | Cys | Trp | Ile | Asn | Asn |
| | 130 | | | | 135 | | | | | 140 | | | | | |
| Val | Ala | Leu | Phe | Thr | Leu | Trp | Pro | Leu | Leu | Lys | Lys | Asp | Asn | Leu | Val |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 145 | | | | | 150 | | | | 155 | | | | 160 | | |
| Leu | Gln | Tyr | Gly | Val | Met | Phe | Met | Phe | Ser | Asn | Trp | Leu | Ile | Gly | Asn |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Phe | Ser | Phe | Val | Thr | Pro | Arg | Phe | Leu | Pro | Lys | Phe | Leu | Thr | Pro | Gly |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Pro | Ser | Ile | Ser | Asp | Ile | Asp | Val | Asp | Tyr | Arg | Arg | Ala | Ser | Leu | Leu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Pro | Lys | Ser | Leu | Ile | Trp | Arg | Leu | Ile | Ile | Val | Gly | Ser | Tyr | Ile | Ala |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Met | Gly | Ile | Ile | His | Phe | Leu | Asp | Tyr | Tyr | Val | Ser | Pro | Pro | Ser | Gln |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Glu | Arg | Tyr | Lys | Tyr | Pro | Asp | Leu | Trp | Val | Leu | Ala | Asn | Cys | Ser | Leu |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Gly | Phe | Ser | Cys | Phe | Val | Thr | Phe | Trp | Ile | Trp | Asn | Asn | Tyr | Xaa | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Phe | Glu | Arg | Met | Arg | Asn | Ser | Thr | Leu | Gln | Asp | Leu | | | | |
| | | 275 | | | | | 280 | | | | | | | | |

<210> 91

<211> 250

<212> PRT

<213> Schizosaccharomyces pombe

<400> 91

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ser | Val | Thr | Val | Val | Phe | Thr | Phe | Ser | Leu | Ile | Leu | Phe | Pro | Trp |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Ile | Tyr | Met | Asp | Tyr | Lys | Thr | Leu | Leu | Pro | Gln | Ile | Leu | His | Arg | Val |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Phe | Pro | Phe | Ala | Arg | Gly | Leu | Trp | Glu | Asp | Lys | Val | Ala | Asn | Phe | Trp |
| | | 35 | | | | 40 | | | | | | 45 | | | |
| Cys | Thr | Leu | Asn | Thr | Val | Phe | Lys | Ile | Arg | Glu | Val | Phe | Thr | Leu | His |
| | 50 | | | | 55 | | | | | | 60 | | | | |
| Gln | Leu | Gln | Val | Ile | Ser | Leu | Ile | Phe | Thr | Leu | Ile | Ser | Ile | Leu | Pro |
| 65 | | | | 70 | | | | | | 75 | | | | | 80 |
| Ser | Cys | Val | Ile | Leu | Phe | Leu | Tyr | Pro | Arg | Lys | Arg | Leu | Leu | Ala | Leu |
| | | | | 85 | | | | 90 | | | | | | 95 | |
| Gly | Phe | Ala | Ser | Ala | Ser | Trp | Gly | Phe | Phe | Leu | Phe | Ser | Phe | Gln | Val |
| | | 100 | | | | | 105 | | | | | | 110 | | |
| His | Glu | Lys | Ser | Val | Leu | Leu | Pro | Leu | Leu | Pro | Thr | Ser | Ile | Leu | Leu |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Cys | His | Gly | Asn | Ile | Thr | Thr | Lys | Pro | Trp | Ile | Ala | Leu | Ala | Asn | Asn |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Leu | Ala | Val | Phe | Ser | Leu | Trp | Pro | Leu | Leu | Lys | Lys | Asp | Gly | Leu | Gly |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Leu | Gln | Tyr | Phe | Thr | Leu | Val | Leu | Met | Trp | Asn | Trp | Ile | Gly | Asp | Met |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Val | Val | Phe | Ser | Lys | Asn | Val | Leu | Phe | Arg | Phe | Ile | Gln | Leu | Ser | Phe |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Tyr | Val | Gly | Met | Ile | Val | Ile | Leu | Gly | Ile | Asp | Leu | Phe | Ile | Pro | Pro |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Pro | Ser | Arg | Tyr | Pro | Asp | Leu | Trp | Val | Ile | Leu | Asn | Val | Thr | Leu | Ser |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Phe | Ala | Gly | Phe | Phe | Thr | Ile | Tyr | Leu | Trp | Thr | Leu | Gly | Arg | Leu | Leu |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| His | Ile | Ser | Ser | Lys | Leu | Ser | Thr | Asp | Leu | | | | | | |
| | | | | 245 | | | | | 250 | | | | | | |

<210> 92
 <211> 238
 <212> PRT
 <213> Kluyveromyces lactis

<220>
 <221> MOD_RES
 <222> (88)...(99)
 <223> Xaa is a variable amino acid

<400> 92
 Met His Arg Ile Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val
 1 5 10 15
 Ala Asn Phe Trp Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu
 20 25 30
 Phe Thr Gln Lys Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile
 35 40 45
 Gly Leu Leu Pro Ser Phe Ile Ile Thr Phe Leu Tyr Pro Lys Arg His
 50 55 60
 Leu Leu Pro Tyr Ala Leu Ala Ala Cys Ser Met Ser Phe Phe Leu Phe
 65 70 75 80
 Ser Phe Gln Val His Glu Lys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 85 90 95
 Xaa Xaa Xaa Tyr Thr Ser Arg Asp Trp Asn Val Leu Ser Leu Val Cys
 100 105 110
 Trp Ile Asn Asn Val Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys
 115 120 125
 Asp Asn Leu Val Leu Gln Tyr Gly Val Met Phe Met Phe Ser Asn Trp
 130 135 140
 Leu Ile Gly Asn Phe Ser Phe Val Thr Pro Arg Phe Leu Pro Lys Phe
 145 150 155 160
 Leu Thr Pro Gly Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg
 165 170 175
 Ala Ser Leu Leu Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly
 180 185 190
 Ser Tyr Ile Ala Met Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser
 195 200 205
 Pro Pro Ser Lys Tyr Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu
 210 215 220
 Gly Phe Ser Cys Phe Val Thr Phe Trp Ile Trp Asn Asn Tyr
 225 230 235

<210> 93
 <211> 219
 <212> PRT
 <213> Arabidopsis thaliana

<400> 93
 Leu Ser Arg Leu Ala Pro Phe Glu Arg Gly Ile Tyr Glu Asp Tyr Val
 1 5 10 15
 Ala Asn Phe Trp Cys Thr Thr Ser Ile Leu Ile Lys Trp Lys Asn Leu
 20 25 30
 Phe Thr Thr Gln Ser Leu Lys Ser Ile Ser Leu Ala Ala Thr Ile Leu
 35 40 45
 Ala Ser Leu Pro Ser Met Val Gln Gln Ile Leu Ser Pro Ser Asn Glu
 50 55 60

```

Gly Phe Leu Tyr Gly Leu Leu Asn Ser Ser Met Ala Phe Tyr Leu Phe
65          70          75          80
Ser Phe Gln Val His Glu Lys Ser Ile Leu Met Pro Phe Leu Ser Ala
85          90
Thr Leu Leu Ala Leu Lys Leu Pro Asp His Phe Ser His Leu Thr Tyr
100        105        110
Tyr Ala Leu Phe Ser Met Phe Pro Leu Leu Cys Arg Asp Lys Leu Leu
115        120        125
Ile Pro Tyr Leu Thr Leu Ser Phe Leu Phe Thr Val Ile Tyr His Ser
130        135        140
Pro Gly Asn His His Ala Ile Gln Lys Thr Asp Val Ser Phe Phe Ser
145        150        155        160
Phe Lys Asn Phe Pro Gly Tyr Val Phe Leu Leu Arg Thr His Phe Phe
165        170        175
Ile Ser Val Val Leu His Val Leu Tyr Leu Thr Ile Lys Pro Pro Gln
180        185        190
Lys Tyr Pro Phe Leu Phe Glu Ala Leu Ile Met Ile Leu Cys Phe Ser
195        200        205
Tyr Phe Ile Met Phe Ala Phe Tyr Thr Asn Tyr
210        215

```

<210> 94

<211> 252

<212> PRT

<213> Kluyveromyces lactis

<220>

<221> MOD_RES

<222> (114)...(125)

<223> Xaa is a variable amino acid

<400> 94

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Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile Tyr Ile
1          5          10          15
Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile Phe Pro
20        25        30
Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Val
35        40        45
Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys Asp Leu
50        55        60
Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro Ser Phe
65        70        75        80
Ile Ile Thr Phe Leu Tyr Pro Lys Arg His Leu Leu Pro Tyr Ala Leu
85        90        95
Ala Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln Val His Glu
100       105       110
Lys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Thr Ser
115       120       125
Arg Asp Trp Asn Val Leu Ser Leu Val Cys Trp Ile Asn Asn Val Ala
130       135       140
Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Asn Leu Val Leu Gln
145       150       155       160
Tyr Gly Val Met Phe Met Val Thr Pro Arg Phe Leu Pro Lys Phe Leu
165       170       175
Thr Pro Gly Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg Ala
180       185       190
Ser Leu Leu Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly Ser

```

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | 195 | | | | 200 | | | | 205 | | | | | | |
| Tyr | Ile | Ala | Met | Gly | Ile | Ile | His | Phe | Leu | Asp | Tyr | Tyr | Val | Ser | Pro | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Pro | Ser | Lys | Tyr | Pro | Asp | Leu | Trp | Val | Leu | Ala | Asn | Cys | Ser | Leu | Gly | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Phe | Ser | Cys | Phe | Val | Thr | Phe | Trp | Ile | Trp | Asn | Asn | | | | | |
| | | | | 245 | | | | | 250 | | | | | | | |

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<210> 95
<211> 259
<212> PRT
<213> Homo sapiens
```

[illegible]

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<210> 96
<211> 1617
<212> DNA
<213> Mus musculus
```

<400> 96
atgaagatga gacgctacaa gctctttctc atgttctgta tggctggcct gtgcctcata 60

```

tccttcctgc acttctttaa gaccttatcc tatgtcacct tcccagagaga actggcctcc 120
ctcagcccta acctcgtatc cagcttcttc tggaacaatg cccctgtcac tcccaggcc 180
agtccggagc cgggtggccc cgacctattg cggacacccc tctactccca ctctcccctg 240
ctccagccac tgtccccgag caaggccaca gaggaactgc accgggtgga cttcgtgttg 300
ccggaggaca ccacggagta ttttgtgcgc accaaagctg gtggtgtgtg cttcaaacca 360
ggtaccagga tgctggagaa accttcgcca gggcggacag aggagaagcc cgaagtgtct 420
gagggctcct cagcccgggg acctgctcgg aggcccatga ggcacgtgtt gagtacgcgg 480
gagcgcttg gcagccgggg cactaggcgc aagtgggttg agtgtgtgtg cctgccaggc 540
tggcacgggc ccagttgcgg ggtgccacg gtggtgcagt attccaacct gcccaccaag 600
gaacgcctgg taccaggga ggtaccgagg cgggttatca acgccatcaa catcaaccac 660
gagttcgacc tgctggatgt gcgcttccat gagctgggag atgttggtga cgccttcgtg 720
gtctgtgaat ctaatttcac cgcctacggg gagcctcggc cgctcaagtt ccgagagatg 780
ctgaccaatg gcaccttcga gtacatccgc cacaagggtg tctatgtctt cctggaccat 840
ttcccacctg gtggccgtca ggacggctgg attgcggatg actacctgcg caccttcctc 900
acccaggatg gcgtctccc cctgcgcaac ctgcggccc atgacgtctt tatcatcgac 960
gatgcggacg agatccctgc gcgtgatggt gtgctgttcc tcaaactcta cgatggctgg 1020
acagagccct tcgccttcca catgcggaag tcctgtatg gtttcttctg gaagcagccg 1080
ggcacactgg aggtggtgtc aggtgcacc atggacatgc tgcaggccgt gtatgggctg 1140
gatggcatcc gcctgcgcc cgcacagtac tacaccatgc ccaacttccg gcagtatgag 1200
aaccgcaccg gccacatcct agtgcatggt tctctcggca gcccctgca cttcgcgggc 1260
tggcattgct cctggtgctt cacacccgag ggcattact ttaaactcgt gtcagcccag 1320
aatggcgact tccccgctg gggtgactat gaggacaaga gggacctcaa ttacatccgc 1380
agcttgatcc gactggggg atggttcgac ggaacgcagc aggagtacc tcctgcggac 1440
ccagtgagc acatgtatgc tcctaaatac ctgctcaaga actatgacca gttccgctac 1500
ttgctggaat atccctacc ggagcccaag agcactgtag agggtgggag ccagaaccag 1560
ggctcagatg gaaggccatc tgctgtcagg ggcaagttgg atacagtga gggctag 1617

```

<210> 97

<211> 536

<212> PRT

<213> Mus musculus

<400> 97

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Met Arg Arg Tyr Lys Leu Phe Leu Met Phe Cys Met Ala Gly Leu Cys
 1           5           10          15
Leu Ile Ser Phe Leu His Phe Phe Lys Thr Leu Ser Tyr Val Thr Phe
 20          25          30
Pro Arg Glu Leu Ala Ser Leu Ser Pro Asn Leu Ile Ser Ser Phe Phe
 35          40          45
Trp Asn Asn Ala Pro Val Thr Pro Gln Ala Ser Pro Glu Pro Gly Asp
 50          55          60
Pro Asp Leu Leu Arg Thr Pro Leu Tyr Ser His Ser Pro Leu Leu Gln
 65          70          75          80
Pro Leu Ser Pro Ser Lys Ala Thr Glu Glu Leu His Arg Val Asp Phe
 85          90          95
Val Leu Pro Glu Asp Thr Thr Glu Tyr Phe Val Arg Thr Lys Ala Gly
100         105         110
Gly Val Cys Phe Lys Pro Gly Thr Arg Met Leu Glu Lys Pro Ser Pro
115         120         125
Gly Arg Thr Glu Glu Lys Thr Glu Val Ser Glu Gly Ser Ser Ala Arg
130         135         140
Gly Pro Ala Arg Arg Pro Met Arg His Val Leu Ser Ser Arg Glu Arg
145         150         155         160
Leu Gly Ser Arg Gly Thr Arg Arg Lys Trp Val Glu Cys Val Cys Leu
165         170         175
Pro Gly Trp His Gly Pro Ser Cys Gly Val Pro Thr Val Val Gln Tyr
180         185         190
Ser Asn Leu Pro Thr Lys Glu Arg Leu Val Pro Arg Glu Val Pro Arg

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 195 | | 200 | | 205 | | | | | | | | | | |
| Arg | Val | Ile | Asn | Ala | Ile | Asn | Ile | Asn | His | Glu | Phe | Asp | Leu | Leu | Asp |
| | 210 | | 215 | | 220 | | | | | | | | | | |
| Val | Arg | Phe | His | Glu | Leu | Gly | Asp | Val | Val | Asp | Ala | Phe | Val | Val | Cys |
| 225 | | | | 230 | | | | | | 235 | | | | | 240 |
| Asp | Ser | Asn | Phe | Thr | Ala | Tyr | Gly | Glu | Pro | Arg | Pro | Leu | Lys | Phe | Arg |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Glu | Met | Leu | Thr | Asn | Gly | Thr | Phe | Glu | Tyr | Ile | Arg | His | Lys | Val | Leu |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Tyr | Val | Phe | Leu | Asp | His | Phe | Pro | Pro | Gly | Gly | Arg | Gln | Asp | Gly | Trp |
| | 275 | | | | | 280 | | | | | | 285 | | | |
| Ile | Ala | Asp | Asp | Tyr | Leu | Arg | Thr | Phe | Leu | Thr | Gln | Asp | Gly | Val | Ser |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Arg | Leu | Arg | Asn | Leu | Arg | Pro | Asp | Asp | Val | Phe | Ile | Ile | Asp | Asp | Ala |
| 305 | | | | 310 | | | | | | 315 | | | | | 320 |
| Asp | Glu | Ile | Pro | Ala | Arg | Asp | Gly | Val | Leu | Phe | Leu | Lys | Leu | Tyr | Asp |
| | | | 325 | | | | | 330 | | | | | | 335 | |
| Gly | Trp | Thr | Glu | Pro | Phe | Ala | Phe | His | Met | Arg | Lys | Ser | Leu | Tyr | Gly |
| | | 340 | | | | | 345 | | | | | 350 | | | |
| Phe | Phe | Trp | Lys | Gln | Pro | Gly | Thr | Leu | Glu | Val | Val | Ser | Gly | Cys | Thr |
| | 355 | | | | | 360 | | | | | | 365 | | | |
| Met | Asp | Met | Leu | Gln | Ala | Val | Tyr | Gly | Leu | Asp | Gly | Ile | Arg | Leu | Arg |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Arg | Arg | Gln | Tyr | Tyr | Thr | Met | Pro | Asn | Phe | Arg | Gln | Tyr | Glu | Asn | Arg |
| 385 | | | | 390 | | | | | 395 | | | | | | 400 |
| Thr | Gly | His | Ile | Leu | Val | Gln | Trp | Ser | Leu | Gly | Ser | Pro | Leu | His | Phe |
| | | 405 | | | | | | 410 | | | | | 415 | | |
| Ala | Gly | Trp | His | Cys | Ser | Trp | Cys | Phe | Thr | Pro | Glu | Gly | Ile | Tyr | Phe |
| | | 420 | | | | | 425 | | | | | 430 | | | |
| Lys | Leu | Val | Ser | Ala | Gln | Asn | Gly | Asp | Phe | Pro | Arg | Trp | Gly | Asp | Tyr |
| | 435 | | | | | 440 | | | | | 445 | | | | |
| Glu | Asp | Lys | Arg | Asp | Leu | Asn | Tyr | Ile | Arg | Ser | Leu | Ile | Arg | Thr | Gly |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Gly | Trp | Phe | Asp | Gly | Thr | Gln | Gln | Glu | Tyr | Pro | Pro | Ala | Asp | Pro | Ser |
| 465 | | | | 470 | | | | | 475 | | | | | 480 | |
| Glu | His | Met | Tyr | Ala | Pro | Lys | Tyr | Leu | Leu | Lys | Asn | Tyr | Asp | Gln | Phe |
| | | 485 | | | | | | 490 | | | | | 495 | | |
| Arg | Tyr | Leu | Leu | Glu | Asn | Pro | Tyr | Arg | Glu | Pro | Lys | Ser | Thr | Val | Glu |
| | | 500 | | | | | 505 | | | | | 510 | | | |
| Gly | Gly | Arg | Gln | Asn | Gln | Gly | Ser | Asp | Gly | Arg | Ser | Ser | Ala | Val | Arg |
| | 515 | | | | | 520 | | | | | 525 | | | | |
| Gly | Lys | Leu | Asp | Thr | Ala | Glu | Gly | | | | | | | | |
| | 530 | | | | | 535 | | | | | | | | | |

<210> 98

<211> 2115

<212> DNA

<213> Homo sapiens

<400> 98

```

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tgatggtgaa atgagatgag gctccgcaat ggaactgtag ccactgcttt agcatttatc 180
acttctttcc ttactttgtc ttggtatact acatggcaaa atgggaaaga aaaactgatt 240
gcttatcaac gagaattcct tgctttgaaa gaacgtcttc gaatagctga acacagaatc 300
tcacagcgct cttctgaatt aaatacgatt gtgcaacagt tcaagcgtgt aggagcagaa 360
acaaatggaa gtaaggatgc gttgaataag ttttcagata ataccctaaa gctgttaaag 420

```



```

gagttaacaa gcaaaaaatc tcttcaagt ccaagtattt attatcattt gcctcattta 480
ttgaaaaatg aaggaagtct tcaacctgct gtacagattg gcaacggaag aacaggagtt 540
tcaatagtca tgggcattcc cacagtgaag agagaagtta aatcttacct catagaaact 600
cttcattccc ttattgataa cctgtatcct gaagagaagt tggactgtgt tatagtagtc 660
ttcataggag agacagatat tgattatgta catggtgttg tagccaacct ggagaaagaa 720
ttttctaaag aaatcagttc tggcttggtg gaagtcatat caccctga aagctattat 780
cctgacttga caaacctaaa ggagacattt ggagactcca aagaaagagt aagatggaga 840
acaaagcaaa acctagatta ctgttttcta atgatgtatg ctcaagaaaa gggcatatat 900
tacattcagc ttgaagatga tattattgtc aaacaaaatt attttaatac cataaaaaat 960
tttgacttcc aactttcttc tgaggaatgg atgattctag agttttccca gctgggcttc 1020
attggtaaaa tgtttcaagc gccggatctt actctgattg tagaattcat attcatgttt 1080
tacaaggaga aaccatttga ttggtcctcg gaccatattc tctgggtgaa agtctgcaac 1140
cctgaaaaag atgcaaaaca ttgtgataga cagaaagcaa atctgcgaat tcgcttcaga 1200
ccttcccttt tccaacatgt tggctctgcac tcatcactat caggaaaaat ccaaaaaactc 1260
acggataaag attatatgaa accattactt cttaaaaatcc atgtaaacc accctgcggag 1320
gtatctactt ccttgaagggt ctaccaaggg catacgctgg agaaaaactta catgggagag 1380
gatttcttct gggctatcac accgatagct ggagactaca tcttgtttaa atttgataaa 1440
ccagtcaatg tagaaagtta tttgttccat agcggcaacc aagaacatcc tggagatatt 1500
ctgctaaaca caactgtgga agttttgcct ttaagagtg aaggtttgga aataagcaaa 1560
gaaaccaaag acaaacgatt agaagatggc tatttcagaa taggaaaatt tgagaatggt 1620
gttgacagaag gaatggtgga tccaagtctc aatcccattt cagcctttcg actttcagtt 1680
attcagaatt ctgctgtttg ggccattctt aatgagattc atattaaaaa agccaccaac 1740
tgatcatctg agaaaccaac acattttttc ctgtgaattt gtttaattaa gatagttaag 1800
catgtatctt ttttttattt ctacttgaac actacctctt gtgaagtcta ctgtagataa 1860
gacgattgtc atttccactt ggaaagtgaa tctcccataa taattgtatt tgtttgaaac 1920
taagctgtcc tcagatttta acttgactca aacatttttc aattatgaca gcctgttaat 1980
atgacttgta ctatttttgt attatactaa tacataagag ttgtacatat tgttacattc 2040
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acttatttta ctatt 2115

```

<210> 99

<211> 535

<212> PRT

<213> Homo sapiens

<400> 99

```

Met Arg Leu Arg Asn Gly Thr Val Ala Thr Ala Leu Ala Phe Ile Thr
 1          5          10          15
Ser Phe Leu Thr Leu Ser Trp Tyr Thr Thr Trp Gln Asn Gly Lys Glu
 20          25          30
Lys Leu Ile Ala Tyr Gln Arg Glu Phe Leu Ala Leu Lys Glu Arg Leu
 35          40          45
Arg Ile Ala Glu His Arg Ile Ser Gln Arg Ser Ser Glu Leu Asn Thr
 50          55          60
Ile Val Gln Gln Phe Lys Arg Val Gly Ala Glu Thr Asn Gly Ser Lys
 65          70          75          80
Asp Ala Leu Asn Lys Phe Ser Asp Asn Thr Leu Lys Leu Leu Lys Glu
 85          90          95
Leu Thr Ser Lys Lys Ser Leu Gln Val Pro Ser Ile Tyr Tyr His Leu
100          105          110
Pro His Leu Leu Lys Asn Glu Gly Ser Leu Gln Pro Ala Val Gln Ile
115          120          125
Gly Asn Gly Arg Thr Gly Val Ser Ile Val Met Gly Ile Pro Thr Val
130          135          140
Lys Arg Glu Val Lys Ser Tyr Leu Ile Glu Thr Leu His Ser Leu Ile
145          150          155          160
Asp Asn Leu Tyr Pro Glu Glu Lys Leu Asp Cys Val Ile Val Val Phe
165          170          175

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```

Ile Gly Glu Thr Asp Ile Asp Tyr Val His Gly Val Val Ala Asn Leu
      180      185      190
Glu Lys Glu Phe Ser Lys Glu Ile Ser Ser Gly Leu Val Glu Val Ile
      195      200      205
Ser Pro Pro Glu Ser Tyr Tyr Pro Asp Leu Thr Asn Leu Lys Glu Thr
      210      215      220
Phe Gly Asp Ser Lys Glu Arg Val Arg Trp Arg Thr Lys Gln Asn Leu
      225      230      235      240
Asp Tyr Cys Phe Leu Met Met Tyr Ala Gln Glu Lys Gly Ile Tyr Tyr
      245      250      255
Ile Gln Leu Glu Asp Asp Ile Ile Val Lys Gln Asn Tyr Phe Asn Thr
      260      265      270
Ile Lys Asn Phe Ala Leu Gln Leu Ser Ser Glu Glu Trp Met Ile Leu
      275      280      285
Glu Phe Ser Gln Leu Gly Phe Ile Gly Lys Met Phe Gln Ala Pro Asp
      290      295      300
Leu Thr Leu Ile Val Glu Phe Ile Phe Met Phe Tyr Lys Glu Lys Pro
      305      310      315      320
Ile Asp Trp Leu Leu Asp His Ile Leu Trp Val Lys Val Cys Asn Pro
      325      330      335
Glu Lys Asp Ala Lys His Cys Asp Arg Gln Lys Ala Asn Leu Arg Ile
      340      345      350
Arg Phe Arg Pro Ser Leu Phe Gln His Val Gly Leu His Ser Ser Leu
      355      360      365
Ser Gly Lys Ile Gln Lys Leu Thr Asp Lys Asp Tyr Met Lys Pro Leu
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Lys Val Tyr Gln Gly His Thr Leu Glu Lys Thr Tyr Met Gly Glu Asp
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Phe Phe Trp Ala Ile Thr Pro Ile Ala Gly Asp Tyr Ile Leu Phe Lys
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Gln Glu His Pro Gly Asp Ile Leu Leu Asn Thr Thr Val Glu Val Leu
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Pro Phe Lys Ser Glu Gly Leu Glu Ile Ser Lys Glu Thr Lys Asp Lys
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<210> 101
<211> 740
<212> PRT
<213> Mus musculus

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| 1 | | | | 5 | | | | 10 | | | | | 15 | | | |
| Phe | Leu | Val | Thr | Phe | Gly | Phe | Ile | Trp | Gly | Met | Met | Leu | Leu | His | Phe | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Thr | Ile | Gln | Gln | Arg | Thr | Gln | Pro | Glu | Ser | Ser | Ser | Met | Leu | Arg | Glu | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Gln | Ile | Leu | Asp | Leu | Ser | Lys | Arg | Tyr | Ile | Lys | Ala | Leu | Ala | Glu | Glu | |
| | | 50 | | | | 55 | | | | | 60 | | | | | |
| Asn | Arg | Asp | Val | Val | Asp | Gly | Pro | Tyr | Ala | Gly | Val | Met | Thr | Ala | Tyr | |
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| Asp | Leu | Lys | Lys | Thr | Leu | Ala | Val | Leu | Leu | Asp | Asn | Ile | Leu | Gln | Arg | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Ile | Gly | Lys | Leu | Glu | Ser | Lys | Val | Asp | Asn | Leu | Val | Asn | Gly | Thr | Gly | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Ala | Asn | Ser | Thr | Asn | Ser | Thr | Thr | Ala | Val | Pro | Ser | Leu | Val | Ser | Leu | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Glu | Lys | Ile | Asn | Val | Ala | Asp | Ile | Ile | Asn | Gly | Val | Gln | Glu | Lys | Cys | |
| | | 130 | | | | 135 | | | | | 140 | | | | | |
| Val | Leu | Pro | Pro | Met | Asp | Gly | Tyr | Pro | His | Cys | Glu | Gly | Lys | Ile | Lys | |
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| Trp | Met | Lys | Asp | Met | Trp | Arg | Ser | Asp | Pro | Cys | Tyr | Ala | Asp | Tyr | Gly | |
| | | | | 165 | | | | 170 | | | | | | 175 | | |
| Val | Asp | Gly | Thr | Ser | Cys | Ser | Phe | Phe | Ile | Tyr | Leu | Ser | Glu | Val | Glu | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Asn | Trp | Cys | Pro | Arg | Leu | Pro | Trp | Arg | Ala | Lys | Asn | Pro | Tyr | Glu | Glu | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ala | Asp | His | Asn | Ser | Leu | Ala | Glu | Ile | Arg | Thr | Asp | Phe | Asn | Ile | Leu | |
| | | 210 | | | | 215 | | | | | 220 | | | | | |
| Tyr | Gly | Met | Met | Lys | Lys | His | Glu | Glu | Phe | Arg | Trp | Met | Arg | Leu | Arg | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Ile | Arg | Arg | Met | Ala | Asp | Ala | Trp | Ile | Gln | Ala | Ile | Lys | Ser | Leu | Ala | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Glu | Lys | Gln | Asn | Leu | Glu | Lys | Arg | Lys | Arg | Lys | Lys | Ile | Leu | Val | His | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Leu | Gly | Leu | Leu | Thr | Lys | Glu | Ser | Gly | Phe | Lys | Ile | Ala | Glu | Thr | Ala | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Phe | Ser | Gly | Gly | Pro | Leu | Gly | Glu | Leu | Val | Gln | Trp | Ser | Asp | Leu | Ile | |
| | | 290 | | | | 295 | | | | | 300 | | | | | |
| Thr | Ser | Leu | Tyr | Leu | Leu | Gly | His | Asp | Ile | Arg | Ile | Ser | Ala | Ser | Leu | |
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| Ala | Glu | Leu | Lys | Glu | Ile | Met | Lys | Lys | Val | Val | Gly | Asn | Arg | Ser | Gly | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Cys | Pro | Thr | Val | Gly | Asp | Arg | Ile | Val | Glu | Leu | Ile | Tyr | Ile | Asp | Ile | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Val | Gly | Leu | Ala | Gln | Phe | Lys | Lys | Thr | Leu | Gly | Pro | Ser | Trp | Val | His | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |
| Tyr | Gln | Cys | Met | Leu | Arg | Val | Leu | Asp | Ser | Phe | Gly | Thr | Glu | Pro | Glu | |
| | | 370 | | | | 375 | | | | | 380 | | | | | |
| Phe | Asn | His | Ala | Ser | Tyr | Ala | Gln | Ser | Lys | Gly | His | Lys | Thr | Pro | Trp | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | |
| Gly | Lys | Trp | Asn | Leu | Asn | Pro | Gln | Gln | Phe | Tyr | Thr | Met | Phe | Pro | His | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
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| | | | 420 | | | | | 425 | | | | | 430 | | | |
| Ser | Ser | Asp | Ile | His | His | Ile | Asn | Glu | Ile | Lys | Arg | Gln | Asn | Gln | Ser | |
| | | 435 | | | | | 440 | | | | | 445 | | | | |
| Leu | Val | Tyr | Gly | Lys | Val | Asp | Ser | Phe | Trp | Lys | Asn | Lys | Lys | Ile | Tyr | |
| | | 450 | | | | 455 | | | | | 460 | | | | | |
| Leu | Asp | Ile | Ile | His | Thr | Tyr | Met | Glu | Val | His | Ala | Thr | Val | Tyr | Gly | |

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465          470          475          480
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          500          505          510
Gly Leu Gly Phe Pro Tyr Glu Gly Pro Ala Pro Leu Glu Ala Ile Ala
          515          520          525
Asn Gly Cys Ala Phe Leu Asn Pro Lys Phe Asn Pro Pro Lys Ser Ser
          530          535          540
Lys Asn Thr Asp Phe Phe Ile Gly Lys Pro Thr Leu Arg Glu Leu Thr
545          550          555          560
Ser Gln His Pro Tyr Ala Glu Val Phe Ile Gly Arg Pro His Val Trp
          565          570          575
Thr Val Asp Leu Asn Asn Arg Glu Glu Val Glu Asp Ala Val Lys Ala
          580          585          590
Ile Leu Asn Gln Lys Ile Glu Pro Tyr Met Pro Tyr Glu Phe Thr Cys
          595          600          605
Glu Gly Met Leu Gln Arg Ile Asn Ala Phe Ile Glu Lys Gln Asp Phe
          610          615          620
Cys His Gly Gln Val Met Trp Pro Pro Leu Ser Ala Leu Gln Val Lys
625          630          635          640
Leu Ala Glu Pro Gly Gln Ser Cys Lys Gln Val Cys Gln Glu Ser Gln
          645          650          655
Leu Ile Cys Glu Pro Ser Phe Phe Gln His Leu Asn Lys Glu Lys Asp
          660          665          670
Leu Leu Lys Tyr Lys Val Thr Cys Gln Ser Ser Glu Leu Tyr Lys Asp
          675          680          685
Ile Leu Val Pro Ser Phe Tyr Pro Lys Ser Lys His Cys Val Phe Gln
          690          695          700
Gly Asp Leu Leu Leu Phe Ser Cys Ala Gly Ala His Pro Thr His Gln
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<212> PRT

<213> Artificial Sequence

<220>

<223> Illustrative retention signal peptide

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Lys Asp Glu Leu

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<210> 103

<211> 60

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 103

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10

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 <212> PRT
 <213> *Saccharomyces cerevisiae*

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 Tyr Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro
 50 55 60

<210> 106
 <211> 59
 <212> PRT
 <213> *Drosophila melanogaster*

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 35 40 45
 Gly Leu Ile Glu Tyr Cys Trp Asn Thr Tyr Pro
 50 55